

MEMBERSHIP IN THE ASSOCIATION

KENTUCKY

Louisville College of Pharmacy, Louisville; Gordon L. Curry, Dean (1909).

LOUISIANA

Louisiana University, New Orleans College of Pharmacy, New Orleans; John P. McCord, Dean (1923).

Louisiana University, College of Pharmacy, New Orleans; Louisian P. Fearing, Dean (1922).

MARYLAND

University of Maryland, School of Pharmacy, Baltimore; Andrew G. Duffin, Dean (1906).

MASSACHUSETTS

Massachusetts College of Pharmacy, Boston; Howard C. Newton, Dean (1909).

MICHIGAN

University of Michigan, College of Pharmacy, Ann Arbor; Howard B. Lewis, Director (1909).

Robert Institute of Technology, College of Pharmacy and Chemistry, Detroit; John P. Stout, Dean (1923).

Park Institute, College of Pharmacy, St. Rapids; Howard Hopkins, Dean (1920).

Wayne University, College of Pharmacy, Detroit; Roland T. Leiby, Dean (1920).

MINNESOTA

University of Minnesota, College of Pharmacy, Minneapolis; Charles H. Reed, Dean (1901).

MISSISSIPPI

University of Mississippi, School of Pharmacy, Oxford; Hester E. Harrison, Dean (1912).

MISSOURI

St. Louis College of Pharmacy, St. Louis; Charles E. Casper, Dean (1909).

MISSOURI

State University of Missouri, School of Pharmacy, Missouri; Charles E. F. Mallett, Dean (1917).

NEBRASKA

University of Nebraska, College of Pharmacy, Omaha; William A. Jorrell, Dean (1914).

University of Nebraska, College of Pharmacy, Lincoln; Rufus A. Lyman, Dean (1922).

NEW JERSEY

Rutgers University, The State University of New Jersey, New Jersey College of Pharmacy, Newark; Ernest Little, Dean (1923).

Association.

THE AMERICAN JOURNAL

— OF —

PHARMACEUTICAL EDUCATION

Vol. VI

January, 1942

Number 1

CONTENTS

| | |
|---|---------|
| Public Health Service in the Classical World— <i>Michael Ginsburg</i> ... | 7-19 |
| The Influence of Pharmaceutical Education upon the Functions of State Boards of Pharmacy— <i>Robert L. Swain</i> | 19-27 |
| Pharmacy's Contribution to Science— <i>George Denton Beal</i> | 27-32 |
| The Drug Industry's Contribution to Medical Care and to the Progress of Science— <i>Robert P. Fischelis</i> | 32-46 |
| College Education in Its Relation to the Defense of America and American Ideals— <i>Gilbert W. Mead</i> | 46-52 |
| Pharmaceutical Education from the Historical Point of View— <i>George Urdang</i> | 53-60 |
| Business Analysis in the Pharmacy Curriculum— <i>George H. Seferovich</i> | 60-62 |
| Compulsory Review of Examinations and Its Effect upon Grades— <i>Joseph H. Goodness</i> | 63-65 |
| How Efficient is Secondary School Training in Arithmetic? II Additional Data— <i>Lloyd L. Boughton</i> | 66-70 |
| A Proposed Curriculum for the First Year of A Pharmacy Course— <i>John F. McCloskey</i> | 70-78 |
| A Course in the Chemistry of Organic Medicinal Products— <i>Walter H. Hartung</i> | 78-84 |
| Laboratory Work in A Course in the Chemistry of Organic Medicinal Products— <i>W. Taylor Sumerford</i> | 84-89 |
| Should Separate Courses be Given in Organic Chemistry and Organic Pharmaceutical Chemistry?— <i>Eldin V. Lynn</i> | 89-94 |
| Preparing the Pharmacy Student for Research in Pharmacology and Bioassay— <i>Harald G. O. Holck</i> | 94-99 |
| Kodachrome 2"x2" Slides as Economical Teaching Slides— <i>Carl C. Pfeiffer and F. E. Yonkman</i> | 100 |
| Some Methods of Presentation in a Course in Pharmacognosy— <i>Lea G. Gramling</i> | 100-104 |
| A Junior American Pharmaceutical Association— <i>Bernard V. Christensen</i> | 104-110 |
| A Step Toward Closer Cooperation Between Industry and Colleges of Pharmacy— <i>Ernest Little</i> | 111-116 |
| Editorials | 117-121 |
| The Editor's Page..... | 122-128 |
| Gleanings from the Editor's Mail..... | 129-130 |
| Notes and News..... | 131-136 |
| Miscellaneous Items of Interest..... | 137-165 |
| New Books..... | 165-168 |

Published quarterly by the American Association of Colleges of Pharmacy at Lincoln, Nebraska. (Clafin Printing Company.) Subscription price \$2.00. Single copies 50 cents. Entered as second class matter July 1, 1937, at the postoffice at Lincoln, Nebraska, under the Act of August 24, 1912.

Editorial Office: College of Pharmacy, University of Nebraska, Lincoln, Nebraska. Address all communications to the Editor.

Officers and Elective Committees, 1941-1942

PRESIDENT

RUDOLPH ANDREW KUEVER - - - Iowa City, Iowa

VICE-PRESIDENT

PERRY A. FOOTE - - - Gainesville, Florida

SECRETARY-TREASURER

ZADA M. COOPER - - - - - Iowa City, Iowa

EXECUTIVE COMMITTEE

| | | |
|--|--------|----------------------------|
| CHARLES H. ROGERS..... | 1942.. | Minneapolis, Minnesota |
| ANDREW G. DUMEZ..... | 1942.. | Baltimore, Maryland |
| HOWARD C. NEWTON..... | 1942.. | Boston, Massachusetts |
| IVOR GRIFFITH..... | 1943.. | Philadelphia, Pennsylvania |
| FOREST J. GOODRICH..... | 1943.. | Seattle, Washington |
| RUFUS A. LYMAN, Editor..... | | Lincoln, Nebraska |
| H. EVERT KENDIG, Past President..... | | Philadelphia, Pennsylvania |
| RUDOLPH A. KUEVER, President..... | | Iowa City, Iowa |
| ZADA M. COOPER, Secretary-treasurer | | Iowa City, Iowa |

SYLLABUS COMMITTEE

| | | |
|-----------------------|----------|--|
| HOWARD C. NEWTON..... | 1942.... | <i>Boston, Massachusetts</i> |
| ELDIN V. LYNN..... | 1943.... | <i>Boston, Massachusetts</i> |
| JOSEPH B. BURT..... | 1944.... | <i>Lincoln, Nebraska</i> |
| HENRY M. BURLAGE..... | 1945.... | <i>Chapel Hill, North Carolina</i> |
| ELMER H. WIRTH..... | 1946.... | <i>Chicago, Illinois</i> |
| ELMER L. HAMMOND..... | 1947.... | <i>Oxford, Mississippi</i> |
| L. WAIT RISING..... | 1948.... | <i>Seattle, Washington</i> |

PRESIDENT ELECT FOR 1942-1943

HOWARD C. NEWTON.....*Boston, Massachusetts*

Notice

The next meeting of the American Association for the Advancement of Science will be held in Ann Arbor, Michigan on June 22-24, 1942. The program of the Pharmacy Subsection of the Medical Sciences is being made up. The time and place of our sessions will be given more fully when the program is completed.

Authors who wish to present papers before the Subsection are requested to send in titles of papers as soon as possible.

The following information relative to the presentation of papers is given for your guidance:

1. Papers should require not more than 30 minutes for presentation.
2. Three copies of a brief abstract of each paper should be available well in advance of the meeting. These are used by the General Secretary and the Subsection Secretary for the presentation of news releases and reports.
3. The need for lantern, blackboard or chart hanging facilities should be indicated.
4. An original copy of the paper in form for publication should be turned in at the time of the meeting.

Please call this request for papers to the attention of your colleagues.

Glenn L. Jenkins, Secretary
Subsection NP
Purdue University
School of Pharmacy
Lafayette, Indiana

Change in Committee on Status of Pharmacists in the Government Service

Charles H. Rogers to be member instead of H. Evert Kendig

New Appointments

George Urdang, Historian

A. Hamilton Chute, member of the Committee on Distributive Education

Dean Ernest Little represented the Association at the inauguration of Dr. Robert Livingston Johnson as president of Temple University on December 4.

Addition to Report of Committee on Resolutions

From the committee on Educational and Membership Standards.

"The Committee recommends that the president appoint a committee whose membership will be representative of all academic ranks, and whose duty it shall be to study ways and means of making our Association more effective as an educational society. If this committee's study indicates that, to accomplish this, changes should be made in our organizational set up, these facts should be presented in concrete form at the 1942 meeting."

The Committee on Resolutions believed that the report of the Committee on Educational and Membership Standards should be made available to the Committee on Problems and Plans. The value of the suggestions was recognized, but it was thought unnecessary to appoint another committee.

The recommendation of the Committee on Resolutions, to refer the report to the Committee on Problems and Plans, was adopted.

"Invaluable to students . . ."

AMERICAN PROFESSIONAL PHARMACIST

APPLIED PHARMACOLOGY

This popular text, written from the rich experience that comes with more than a third of a century of teaching pharmacology to medical students, presents therapeutics from a scientific viewpoint. It contains information on any drug which may interest you—up-to-date information on its clinical use, application, and effects. The book is arranged for quick reference. In it both theoretical foundations and practical applications are considered. McGuigan's new text is adequate in every way.

By HUGH ALISTER MCGUIGAN, Ph.D., M.D., F.A.C.P.
Professor of Pharmacology and Therapeutics,
University of Illinois College of Medicine

914 pages, 41 illustrations. PRICE, \$9.00

Published by the

C. V. MOSBY COMPANY, St. Louis, Missouri

Iowa City, Iowa
December 30, 1941

Honorable Franklin Delano Roosevelt
President of the United States
Washington, D. C.

My dear President Roosevelt:

The American Association of Colleges of Pharmacy, consisting of 59 member schools located in nearly every state in the Union, is anxious to have you know that all of its facilities and its resources are at your command and at the command of your council.

The Association is giving careful attention to changes that may be required for the training of pharmacists during the duration. It is bending every effort to prepare for anything that may come.

With complete confidence, the Association is standing by, firmly resolved to accept every responsibility and to meet every demand for service made upon it by you, your council and the nation.

Yours very truly,
R. A. KUEVER, President.

The American Journal of Pharmaceutical Education

THE PUBLICATION BOARD

RUFUS A. LYMAN
Chairman and Editor

ZADA M. COOPER
Secretary

Charles H. Rogers

Andrew G. DuMez

H. Evert Kendig

Rudolph A. Kuever

Ivor Griffith

Howard C. Newton

Forest J. Goodrich

Assistant to the Editor

Paul J. Jannke

COLLABORATORS

| | |
|--------------------------|---|
| Airston, Margaret..... | University of Southern California |
| Alstodt, Berl S..... | Long Island University |
| Ambroz, Walden F. | Indianapolis College of Pharmacy |
| Baker, George L..... | University of Toledo |
| Barrett, Leslie B..... | University of Connecticut, College of Pharmacy |
| Bedworth, Wilfrid J..... | University of Buffalo |
| Bienfang, Ralph D..... | University of Oklahoma |
| Boughton, Lloyd L..... | University of Kansas |
| Bradt, Frederick T..... | Wayne University |
| Busse, Louis..... | University of Wisconsin |
| Canis, Otto F. A..... | Fordham University |
| Cataline, Elmon L..... | University of Michigan |
| Cole, B. Olive..... | University of Maryland |
| Cooper, Chauncey I..... | Howard University |
| Cwalina, Gustav E..... | Creighton University |
| Daubert, Bernard F..... | University of Pittsburgh |
| Davis, W. John..... | Duquesne University |
| DeKay, H. George..... | Purdue University |

| | |
|---------------------------|---|
| Durand, Edwin M..... | New Jersey College of Pharmacy |
| Eidsmoe, Clark T..... | South Dakota State College |
| Ferguson, Noel M..... | St. Louis College of Pharmacy |
| Geiler, Frederick L..... | West Virginia University |
| Gidley, William F..... | University of Texas |
| Gramling, Lea G..... | George Washington University |
| Hargreaves, George W..... | Alabama Polytechnic Institute |
| Hiner, L. David..... | Ohio State University |
| Ireland, Edward J..... | Loyola University |
| Jacobs, Marion L..... | University of North Carolina |
| Jones, James W..... | State University of Iowa |
| Johnson Carl H..... | University of Florida |
| Johnson, William W..... | University of Mississippi |
| Kelly, Charles J..... | Xavier University |
| Kerker, Eleanor..... | Columbia University |
| McDonnell, John N..... | Philadelphia College of Pharmacy |
| McFadden, G. Horace..... | Ohio Northern University |
| Mantz, Harry W..... | Temple University |
| Martin, Lewis E..... | University of Illinois |
| Melendez, Esteban N..... | University of Puerto Rico |
| Meredith, Donald T..... | Detroit Institute of Technology |
| Miller, Clifton E..... | North Dakota Agricultural College |
| Mills, Lucille M..... | University of Nebraska |
| Morrison, Robert W..... | University of South Carolina |
| Netz, Charles V..... | University of Minnesota |
| Ohmart, Leslie M..... | Massachusetts College of Pharmacy |
| Prout, William A..... | Medical College of the State of South Carolina |
| Reyes, Feliciano..... | University of the Philippines |
| Rising, L. Wait..... | University of Washington |
| Rivard, W. Henry..... | Rhode Island College of Pharmacy |
| Rowe, Thomas D..... | Medical College of Virginia |
| Schwarz, A. John..... | University of Tennessee |
| Slone, Earl P..... | Louisville College of Pharmacy |
| Smith, Arthur C..... | Ferris Institute |
| Sprowls, Joseph B..... | University of Colorado |
| Stuhr, Ernst T..... | Oregon State College |
| Sumerford, W. Taylor..... | University of Georgia |
| Swinyard, Ewart A..... | University of Idaho, Southern Division |
| Vincent, Hugh C..... | State College of Washington |
| Waldon, Curtis H..... | University of Montana |
| Watts, Nellie P..... | Western Reserve University |

Public Health Service in the Classical World*

MICHAEL GINSBURG

Department of Classics, University of Nebraska

It is a false notion that only in modern times have governments conscious of their obligations towards society seriously attempted to introduce social reforms. Many problems which confront a modern government, for instance assistance to the underprivileged in their struggle against exploitation, measures to combat rising living costs, relief in times of emergency, are not exclusively the product of modern civilization but were familiar to societies from time immemorial and have stirred up humanity for many centuries. History has recorded a number of earnest attempts made in the remote past to improve the condition of the population. In this respect, the records of the two leading countries of Classical Antiquity, Greece and Rome, are particularly enlightening.

It is the purpose of this study to give a survey of the measures taken by these two countries to solve a problem which is of great importance in the daily lives of a people—the establishment of free public medical aid. The honor for realizing this idea belongs to the Greeks who, many centuries before the Christian Era, became aware of its importance.¹

Our sources give hints of the existence of public physicians in Ancient Egypt. In this sense might be interpreted the report of Diodorus² who tells us that anyone in Egypt could, if he needed it receive free medical care while on amilitary expedition or if he were simply travelling. However, since our information is very scant, it is impossible to establish the details of this practice.

When under the influence of the early Christian Church there were introduced a number of important changes in the field of medical help to the poor of the Roman Empire, no new institutions were devised; these changes were actually a return to practices known to Ancient Greece.

The moral duty of a physician to help the sick without

*Dr. Ginsburg, distinguished scholar of the Classics, reveals in this study the progressive efforts of the Classical World in the field of public health. This paper which was submitted at the urgent request of the Editor is a part of a book on social reforms in Antiquity which the author is now preparing.

regard for material reward was acknowledged very early by the Greeks. The ancient legend that Asclepius had been killed by a thunderbolt at Zeus' hands for having accepted remuneration for the resuscitation of a man is very revealing of the Greek conception of a physician's duty.³ It is true that in the Hippocratic oath no reference is made to this self-abnegating practice on the part of a physician, but it is definitely mentioned in one of the precepts of Hippocrates: "I recommend that physicians should not seek too much material profit. . . . Sometimes you will give assistance free. A physician must be prepared to give such aid, particularly if a strange man or a poor man needs it, for where there is love of mankind, love of science is also manifest."⁴

The Greeks realized that it would be humanly impossible to demand such altruism on the part of an individual physician. They understood that more practical measures had to be taken in order to assure regular medical aid to the destitute. The earliest attempt to introduce socialized medicine by legislation was ascribed by Greek tradition to Charondas who was entrusted by the population of his native town, Catana, with the revision of the local constitution. According to Diodorus,⁵ Charondas was the author of a law promulgated in Thurium in Southern Italy which instituted medical help at public expense. Although this report of Diodorus is inaccurate—Charondas who lived in the 6th century could not have sponsored this reform in Thurium which was founded in the following century—his mistake can be understood in the light of the great popularity enjoyed by the laws of Charondas all over Southern Italy. While it is not possible to fix the exact place in Sicily or Southern Italy where this reform originated, it is significant to note that historical tradition connects it with the name of Charondas.

It may be assumed that the idea on which the reform of Charondas was based was appealing to the entire Greek world since many cities adopted it as satisfying the exigencies of life.⁶ We find it in Athens already in the 5th century⁷, and in the following century it makes its appearance in many other cities.⁸ The post of public physician was created in these towns and the candidate to fill it was chosen by popular vote.⁹ As a rule, this candidate was selected from among a number of candidates; before the elections each candidate addressed the assembly of the people explaining his view on the duties of a physician, indicating what mentors he had, and giving

details concerning his previous medical experience. It may be that in some places, as for instance in Athens, several public physicians functioned simultaneously.¹⁰ Cases were known in which a wealthy town invited as public physician a practitioner of international reputation and paid him an exceptionally high salary. In this respect the story of the famous physician Democedes of Crotona in Southern Italy, as told by Herodotus is very interesting.¹¹ Aegina lured him from his home town by offering him the honorarium of one talent.¹² From there he went to Athens which offered him 100 *minae*. Next we find him on the Island of Samos where he received 2 talents and where he stayed until the Persian King Darius made him captive and appointed him his personal physician. Efforts to bring prominent physicians from abroad were occasionally made by Greek cities in periods of epidemics when, not wishing to depend solely on the services of the local physicians, they tried thus to assure the populace the best physicians procurable.

It was the duty of a public physician to render free medical assistance to the entire population of the town.^{13 14} In return he received from the town a fixed salary.¹⁵ To secure the moneys necessary to pay the physician's honorarium and to defray the expenses involved in medical aid, the citizens had to bear a special tax burden. They understood that by group financing of medical assistance, each of them would carry a lighter burden than if they had to deal with a physician individually. The advantages reaped by the town from the creation of such a public health service were quite obvious: the town had a permanent physician in residence whose services were at the disposal of the citizens. Naturally, the poorer classes of the population which formed the majority in each town profited most.¹⁶ Fortunately, the sources at our disposal make it possible to reconstruct the conditions under which the public health system functioned in Greek towns. The public physician upon his nomination obtained from the city authorities a place in which he could practice, called the *iatreion*. Here a physician received his patients, examined them, and performed operations; here also medicines were prepared and distributed among the sick. The cost of the medicines was paid by the town. We may justly assume that as a rule the physician himself prepared the drugs. Pliny, speaking of the physicians of his day, remarked that they knew neither the names of drugs nor how to compound them,

which in former days was part of their equipment.¹⁷ It is true that in Greece, already in the 5th century, the so-called *pharmakopolai* who prepared and sold amulets and drugs were common,¹⁸ but it is beyond doubt that the original custom for the physician himself to prepare the drugs had never actually disappeared from the Greek world.^{19 20}

The *iatreion* was used not only as a clinic but also as a hospital where the majority of the lying-in patients were from the less-wealthy classes of the population. A person suddenly stricken ill could also be taken to such a hospital.²¹

As was mentioned, the public physician was paid from town funds administered by the city treasurers. The tax collected from the citizens for this purpose and for the maintenance of the *iatreion*, called *iatricon*, is not recorded in literary sources but it is referred to in inscriptions.²² Thus, for instance, a Delphic inscription²³ mentions: "The town of Delphi in a regular assembly, with the required number of votes, has decided to exempt Philistion and his descendants from the *choregia* and the *iatricon*." The amount of this tax is not known but it must have been—at least in the case mentioned in the Delphic inscription—quite considerable, for exemption is recorded as a privilege equivalent to exemption from the *choregia*, which usually involved a large expenditure for the taxpayer.²⁴ As for the salary paid to the public physician, it must have been modest and the salary paid to Democedes, mentioned above, must have been exceptional and therefore must have impressed Herodotus. The ordinary public physicians had to be satisfied with a modest living. Aristophanes mentions the meager earnings of the Athenian physicians and it is hardly possible that public physicians were more favored.

Apart from the various functions which the public physician performed in his clinic, he was also expected to make calls on patients unable to come to the *iatreion*. It is clear that the physician often was unable to carry on his work unassisted. The assistants of a public physician were of two types: free-born and slaves.²⁵ The first group consisted of young men who under the guidance of the public physician prepared themselves for the medical profession. Doubtless in the large Greek cities the public physician attracted students in this way. Nominated as a result of a competition with other candidates, the public physician was expected to have a good reputation; his clinic with its many patients offered rich

material for study. These students probably paid for the instruction²⁶ and in this way augmented the scant income of the public physician. They accompanied him on his visits, replaced him when he was absent, and could be delegated by him for duty in cases of emergency. As for the slaves, they did not receive a special training but became acquainted with the routine of the clinical work through experience. An Athenian law forbade medical practice to slaves.²⁷ Therefore the slaves who were attached to an *iatreion* did not prepare themselves for the medical profession but often they possessed great skill in attending patients. These orderlies, who must have been quite numerous in the large cities where the clinic was very active, were public slaves assigned to the public physician by the city authorities. Apart from their assistance to the physician, they were given the special task of caring for sick slaves,²⁸ both those who came to the clinic and those needing aid at home. In this way was solved the problem of medical assistance to slaves who in many cases were engaged in the factories and workshops of their masters and lived separately. Since slaves were not counted as citizens, they did not participate in the payment of the *iatricon* and therefore could not expect to be treated by the public physician himself when they were ill.

We know of cases in which the public physician gave proof of a genuinely unselfish devotion to his work. Their humanitarian efforts to serve their communities both in normal times and during epidemics, which were common in antiquity, have frequently been given recognition in resolutions voted by the grateful assemblies of their towns. Occasionally these honorary decrees were combined with the bestowal of the highest distinctions which were customarily given to the town's most distinguished citizens. It is reported that Hippocrates' services were rewarded by the city of Athens.²⁹ He obtained Athenian citizenship, was initiated into the Eleusinian Mysteries, and he and his descendants could sit at table with the other honored citizens of Athens at the *Prytaneum*. We have inscriptions dating back as far as the 4th century B.C. from Athens and other cities on the Greek mainland, on the islands, and in Asia Minor, which show the cities' recognition of the services of their physicians. Evenor is praised for his zealous services in Athens and for having spent his own money on public health service.³⁰ Another public physician in Athens, Phidias, is praised and rewarded

with a wreath for long service and for refusing to accept an honorarium.³¹ In the 3rd century B.C., the island of Carpathos had Menocritos as public physician for over 20 years. For his outstanding services during an epidemic he received many distinctions from the people's assembly.³² The inscription found at Rhodiapolis in Lycia is very illuminating as to the record of Heraclitos' service to the public. It mentions the honors which he had previously received from the Rhodians, the Alexandrinians, and the Athenians. He was celebrated not only as a physician but also as author of medical and philosophical works. The inscription emphasizes his public service, and praises him for giving aid to the sick without any pay.³³

The best proof that the institution of public physicians had deep roots in Greek life and was a direct response to the needs of the times can be seen in its vitality. It survived the decline of the cities in which it was introduced, a decline which was caused by the loss of their political independence. When in 146 B.C. the Roman Senate decided to impose its authority on the states of Greece, some measure of local self-government was left to them; although the Roman Governor constantly exercised a general supervision over the cities of Greece, these cities retained some of their traditional autonomy. The Romans did not attack the public health service in Greece. Moreover, it is probable that the custom of Greek municipal authorities to assign a clinic to a physician appealed to certain groups of Roman society who looked upon many Greek customs with favor long before the Roman conquest of Greece. In any case, Pliny records an event which obviously suggests the influence of this Greek practice.³⁴ In 220 B.C., the first Greek physician, Archagathus, from the Peloponnesus, settled down in Rome. He obtained Roman citizenship, and the Government bought him an office out of public funds in which to receive patients. The activity of Archagathus came to an early and abrupt end. It is difficult to determine whether he became the victim of the intrigues of the Roman physicians who were jealous of the subsidy their Greek colleague received from the Government, or whether he himself was to blame for his ruin, because of his passion for operations which earned him the soubriquet of *carnifex*—"the butcher". No matter what was the cause of his failure, we have here the first attempt on the part of Roman authorities to procure medical aid for the population, and al-

though Pliny does not mention whether Archagathus received a regular salary from the Government, the purchase of an office for him shows that he must have enjoyed the status similar to that of a public physician.

Our literary and epigraphic sources do not mention public physicians in Rome and other cities of Italy during the Republic.³⁵ One has the impression that the case of Archagatus was unique and was not repeated. As for the Greek cities under the Roman regime which continued to have public physicians, from the days of Julius Caesar they seem to have enjoyed certain financial immunities; some of the cities tried to extend these privileges to a large number by increasing the number of their public physicians, thus depriving the Roman treasury of some revenue. When in the 2nd century A.D. the Roman Government decided to regulate this problem, its intervention seems to have been motivated by fiscal considerations. The reform was announced by a decree of Antoninus Pius;³⁶ it fixed the number of municipal public physicians according to the size of these cities. In the future small cities could have not over 5 physicians enjoying tax immunities; the next larger cities could have 7, and the largest ones 10. It is important to emphasize that this law only authorized the cities to have public physicians without, unfortunately, ordering them to do so. As for the method of their selection, Ulpian describes it in detail.³⁷ The Governor, *præses provinciæ*, who represented the central authority, had no right to interfere in their nomination, which was in the hands of the wealthier groups of the community who examined the record of the nominees' integrity, their morals, and their ability, and chose those to whom "they could entrust themselves and their children in illness". The privileges attached to their status as public physicians were confirmed by the local authorities who also paid them a fixed salary. The authorities had the right to dismiss the public physician in case of gross negligence.³⁸

We come across traces of public physicians in Italy only in the days of Trajan. To his reign belongs a funeral inscription⁴⁰ which a freedman dedicated to the honor of his patron, M. Ulpus Sporus. The inscription records the medical career of the deceased. Originally he was an army physician and later became a *salararius*. The term *salararius* may suggest that Sporus became a public physician "on salary" from the town.⁴¹ Galen, who lived in the 2nd century, mentions

that there were physicians in other cities to whom the authorities gave offices and who thus acted as public physicians.⁴²

The absence of public physicians in the majority of non Greek cities led to the development of a practice which did not exist in the Greek world where the existence of a public health service in most towns made it superfluous. The lower classes of these non Greek towns did not have enough money to pay for the services of private physicians. The many unions which were formed by the proletariat, *collegia tenuiorum*, and which gave their members various advantages had their own physicians who gave aid to the members of a particular union.⁴³

With the passage of time, the establishment of free medical aid for the population of the city of Rome becomes an urgent social problem demanding radical measures. The reform was introduced in 368 by a decree of the Emperors Vallerianian and Valens.⁴⁴ This decree, published at the instigation of the prefect of Rome, Praetextatus, prescribed the establishment of public physicians in all the towns of the Empire.⁴⁵ The number of public physicians was fixed for each town; thus in Rome there were 16. "The physicians knowing that their yearly salaries are paid to them by the people should rather render honest service to them than wait shamefully upon the rich."⁴⁶ "We authorize them to accept for their services whatever their patients give them upon their recovery, but not what they have been promised by the patients while they were sick."⁴⁷ This concession might justify the assumption that the salary paid to the public physicians was modest. If the post of public physician was made vacant by death or other cause, the new candidate had to be chosen without the interference of the influential individuals by the sincere and considered vote of the remaining public physicians.

Our sources do not mention any *iatreia* given by the municipal authorities to these public physicians.⁴⁸ Frequently the absence of such hospitals⁴⁹ left the patients without a place to be treated and only private contributions inspired by Christian ideals could save them. The initiative of socially minded individuals was aimed at filling the gap left by the decree of 368 which did not enforce the establishment of municipal hospitals. It is in this period that the first attempt was made to found hospitals, and the first hospital recorded by our sources is the one founded in 380 by

Fabiola in Rome where she gave shelter to the sick picked up in the city streets and public squares.⁵⁰ The Greek cities always had public institutions called *xenodochia*—asylums for strangers.⁵¹ These asylums, never known to the Romans, continued to function in the Eastern part of the Empire along with other charitable institutions founded by the Greeks, and they developed into institutions for the poor, the aged, and the orphaned.⁵² Some of them were transformed into hospitals. This explains the fact that while in Italy the need for hospitals was felt very acutely, the Eastern part of the Empire had a sufficient number of institutions for the sick.⁵³

This brief historical survey of public health service in the classical world shows that in this, as well as in many other fields of social endeavor, the Romans after a period of inaction eventually followed the examples which were left to them by the Greeks. When the Christian Church began its sponsorship of the various institutions for the protection of public health it actually copied in many instances institutions which had been devised many centuries before by the Greek cities for this purpose. Here too Ancient Greece set permanent examples which were revived long after the glory that was Greece had itself become a legend.

NOTES

1. In Greece this institution was probably an outgrowth of the ancient practice to summon a physician to a town stricken by an epidemic; thus, according to a legend, Epimenides of Crete, a contemporary of Solon, was called to Athens to combat an epidemic of plague: Diog. Laert. I. 110; when a similar disaster befell Sparta, another prominent Cretan physician, Thales of Gortyna, was called for the same purpose: Paus. I. 14. It is natural to assume that the Greek cities, realizing the usefulness of public physicians during emergencies, must have early come to the conclusion that the creation of the post of permanent public physician would be a desirable social innovation. The various pre-Socratic schools of philosophy made important contributions to public medicine, since some of the great philosophers of the 6th century were also physicians: Arturo Castiglioni, *A History of Medicine*, transl. by E. B. Krumbhaar, 1941, pp. 129-30. In the 5th century Empedocles, without occupying a public position, was actively engaged in sanitation work in his native city, Agrigentum, which he saved from a plague by ordering widespread fumigation: Plin. N.H. XXXVI. 69; to forestall a similar danger at Selinuntum, he conceived the plan of purifying a turbid river: Diog. Laert. VIII. 70.
2. I. 82.

3. Pind. *Pyth.* III. 55-58 (cf. L. R. Farnell's remarks in his edition of Pindar, I. p. 97)
4. Hippocr. (Littre) IX. 258.
5. XII. 13. 4.
6. Originally, the state organized medical assistance probably only under exceptional circumstances: in war time, during epidemics, at popular festivals which attracted huge gatherings: H. Bolkestein, *Wohltätigkeit und Armenpflege im vorchristlichen Altertum*, 1939, p. 274.
7. Aristoph. *Acharn.* 1030. They were called δημόσιοι ἰατροί, δημοσιεύοντες.
8. In the days of Xenophon any Greek city of size had public physicians: *Cyr.* I. 6. 15; it is possible that this was also the case in distant Greek colonies, e.g. Massilia, where we find public physicians before Strabo (IV. 1.5).
9. Plat. *Gorg.* 455b; Aristoph. Schol. *Acharn.* 1030.
10. We do not know the exact number of public physicians employed by Athens at one time, but there must have been several; an inscription found there mentions that the public physicians presented sacrifices twice a year to Asklepius and Hygieia: *C. I. Att.* II. 352b.
11. III. 131.
12. The talent most widely used in Greece was the Attic talent; the intrinsic value of the metal contained in this sum of money was about \$1180. The Aeginetan talent was worth about \$1515: Harper's *Dictionary of Classical Literature and Antiquities*, p. 1521. A talent=60 minae.
13. Xen. Schol. *Acharn.* 1030.
14. They were expected to give medical aid to those who needed it (Τοὺς δεομένους: Dittenberger, *Syll.*³ 335; this word did not necessarily mean "poor": cf. Bolkestein, *op. cit.* p. 183) and those who asked for it. The fact that public physicians were not physicians for the poor only is shown by the efforts of some cities to procure the services of the most famous physicians for this post. In some cases the availability of public physicians to the entire population of a city is literally mentioned in inscriptions: e.g. Newton, *Greek Inscriptions in the British Museum*, 143: "For the poor and the rich and the slaves and the free"; the reference to slaves in connection with public physicians is quite unusual.
15. Even in modern times many communities on the islands in the Aegean adhered to the practice of paying a fixed salary to the physician for taking care of the population without any further compensation: Reinach-Newton, *Traité d'épigr.*, p. 50.
16. In Athens, probably since the days of Pisistratus, war invalids were supported by the State. Later this privilege was extended to everyone who on account of physical disability was unable to support himself: c.f. Gerhard Uhlhorn, *Christian Charity in the Ancient Church*, 1883, p. 9.
17. *N. H.* XXXIV. 25.
18. Aristoph. *Clouds* 766.
19. It is of great pharmaceutical interest that Galen complains of the increasing practice on the part of physicians of leaving the

- preparation of medicaments to others instead of preparing them themselves. A list of specialists who (in Greece and Rome) prepared and sold drugs, medicaments and cosmetics is given by Edward Kremers and George Urdang, *History of Pharmacy*, 1940, p. 15.
20. The house of the Vettii at Pompeii has a mural painting representing cupids and Psyche as *unguentarii* in the act of expressing, heating, testing, and selling olive oil: F. H. Garrison, *An Introduction to the History of Medicine*⁴, 1929, p. 119.
 21. Aristoph. *Acharn.* 1222.
 22. Delphi: Dittenberger, *Syll.*³, 437; Teos: *Bull. Corresp. Hell.*, 1922, p. 30g; Cos: Dittenberger, *Syll.*³, 1000; maybe in Egypt: U. Wilcken, *Griech. Ostraka* I. p. 375.
 23. Dittenberger, *Syll.*³, 437.
 24. The importance of the *iatricon* is illustrated by an inscription from Teos (4th century B.C.): new citizens are granted exemption from all taxes except the *iatricon*: *Athen. Mitteil.* XVI p. 292.
 25. *Plat. Laws* IV. 720.
 26. *Plat. Men.* 90c-d.
 27. Women also could not practice medicine. Later this exclusion was limited only to slaves: Hygin. *Fab.* 274. Roman Law did not consider the medical profession as one open only to men (*Cod. Iustin.* VI. 43, 3: "*Medici utriusque sexus*").
 28. *Plat. Laws* IV. 720.
 29. *Plin. N. H.* VII. 37.
 30. *C. I. Att.* II 187. He donated one talent for παρασκευή—perhaps for the equipment of the *iatreion*.
 31. *C. I. Att.* II. 256b.
 32. *I. G.* XII 1. 1032.
 33. *C.I.G.* 4315 n.
 34. *N.H.* XXIX. 6.
 35. The existence in Rome of special magistrates in charge of public health service—*III viri valetudinis*—supposedly mentioned on coins of the late Republic, is not corroborated by any evidence: Reinach, in Daremberg-Saglio, *Diet. des Antiq. Gr. et Rom.* VI, p. 1692.
 36. *Digest* XXVII. 1, 6 (Modestin).
 37. *Digest* L. 9,1.
 38. *Ordo et possessores*: *Digest* L. 9,1.
 39. *Digest* XXVII. 1,6.
 40. Orelli, *Inscr. Lat.* 3507.
 41. *Cod. Iustin.* X. 53,6 uses the term *salaria* for the honorarium of *archiatri*.
 42. Very few data concerning public physicians in the Western part of the Empire are extant; Beneventum: a Roman knight with the title *archiater* is mentioned (*C.I.L.* IX. 1655); Mellaria, Spain: *medicus colonorum coloniae* (*C.I.L.* II. 2348); Nîmes: *medicus coloniae* (*C. I. L.* XII. 3342).
 43. Our information concerning physicians attached to corporations and *collegia* is very casual: cf. A. Vercoutre, "La médecine publique dans l'antiquité grecque", *Rev. Archéol.*, 1880 (N.S. XXXIX), p. 253. In Rome the decree of Valentinian and Valens of 368

- created *archiatri*, one attached to Xystus, the portico reserved for athletic exercises (cf. Vitruv. VI. 7. 4), the other to the Vestals. In Luna two physicians are mentioned as being attached to the *collegium* of *fabri tignarii* (C.I.L. XI. 1355). Besides physicians serving a *collegium* we find also unions of physicians, e.g. in Rome (C.I.L. VI. 9566), Beneventum (C.I.L. IX. 1618); cf. F. F. Abbott, *The Common People of Ancient Rome*, 1927, p. 218.
44. *Cod. Theodos.* XIII. 3,8; cf. Walter Heering, *Kaiser Valentinian I.*, 1927, p. 60.
 45. The main duty of these physicians was to attend to the needs of poor: P. Laborderie-Boulon, "Les institutions d'assistance dans la société romano-byzantine du IV-e siècle à Justinien", *Rev. gén. du dr., de la légis. et de la jurispr. en France et à l'étranger*, LIX, 1935, p. 11 ff., 81 ff., 161 ff.
 46. "*Obsequi tenuioribus malint quam turpiter servire divitibus*"; *Cod. Justin.* X. 53,9; the decree reflects here the traditional point of view of Hellenic deontology proclaimed by Hippocrates to which Christianity did not add much.
 47. *Cod. Justin.* X. 53,9.
 48. In the large country estates, where many slaves were employed, hospitals, called *valetudinaria*, were established very early. In Rome, sick slaves were often abandoned on an island of the Tiber where stood a temple of Aesculapius. Their lot must have been terrible since Claudius, in an effort to force the masters to take care of their slaves, decreed that slaves thus abandoned became free in case of their recovery; a master who killed a sick slave was responsible for murder: *Suet. Claud.* XXV.
 49. In times of war and other emergencies private citizens were asked to receive patients in their homes: *Livy* II, 47. When, under Tiberius, the amphitheater in Fidenae collapsed during a gladiatorial show, the wounded were taken to private homes: *Tac. Ann.* IV. 62-63.
 50. St. Jerome *Ep.* III. 10: "*Prima omnium nosokomeion instituit, in quo aegrotantes colligeret de plateis*". On other welfare-foundations of Fabiola cf. Amédée Thierry, *Derniers Temps de l'Empire Occid.*, 1862, p. 26 and 343.
 51. Aristoph. *School. Birds* 1021.
 52. *Ptochotrophia*, *gerontocomia*, *orphanotrophia*: cf. Bolkestein, *op. cit.* p. 476.
 53. An important branch of health service sponsored by the State from time immemorial was medical service in the army. Physicians accompanied the Greek army during the Trojan War. Many interesting details of this institution are mentioned by *Xen. Anab.* III. 4.30, and *Cyr.* I. 6.15. We learn that medical help was given even to wounded enemies. On military medicine in Imperial Rome where it had a remarkable development, cf. Charles Singer, *From Magic to Science*, 1928, p. 29 ff., and Castiglioni, *op. cit.* p. 237 ff. From the days of Cicero on, each military camp had a hospital under the supervision of a *medicus castrensis*: R. Cagnat, *L'Armée Romaine d'Afrique*, 1892, p. 225. It is certain that under Hadrian every legion and every warship had its physician. Ruins of the

Influence of Pharmaceutical Education upon State Boards 19

military hospitals at Novaesium, near Bonn, and at Carnuntum, near Vienna, both of the 1st century A.D., surpass anything else of this kind in Antiquity: *cf.* Garrison, *op. cit.* p. 118. As for war veterans, it seems improbable that the Roman State did not care for them in case of disability, though measures taken to this effect in the early Republic, when the army consisted of citizens exclusively, are unknown to us. In the later Republic when land grants in conquered territories became common practice, war veterans were the first to profit by them.

The Influence of Pharmaceutical Education Upon The Functions of State Boards of Pharmacy*

ROBERT L. SWAIN

Chairman, Executive Committee, National Association of Boards of
Pharmacy, Editor of DRUG TOPICS

As we stand assembled here today to pay tribute to the School of Pharmacy of the University of Maryland, upon the occasion of the completion of the first century of its proud history, our minds quite logically go back to 1841 as the point from which to get our bearings and from which to rechart the course of events which have transpired since that day.

To really understand the event which we commemorate, and to utilize this understanding as a stimulation to still greater achievement, we must sense the conditions which gave rise to the school in the first instance, and then grasp the meaning of the succession of environments in which the school was progressively placed. In other words, we must put ourselves in the school's shoes, and retrace step by step the long and tortuous journey from 1841 up to now.

It will, however, not be a thankless undertaking. We shall find ourselves rewarded not only by the mental stimulation which such a task assures, but we shall learn much, and from this learning shall come a new sense of appreciation of the significance of things past and a truer sense of evaluation of things to come.

To some, history may be bunk, but certainly no rational person would dare deal so trivially with the vast and varied experience which presses so closely upon us on this very his-

*Read in the Session on Education at the Centennial Celebration of the School of Pharmacy of the University of Maryland, June 5, 1941, at Baltimore.

toric occasion. If we can learn nothing from a consideration of the crowded career of this venerable institution, then experience is a lifeless thing, and the past no more than dead leaves which we need not stir or disturb.

In 1841, when the School of Pharmacy of the University of Maryland, then known as the Maryland College of Pharmacy, first set sail upon the adventure which fortunately gives no signs of coming to a close, there were no pharmacy laws, no boards of pharmacy, and thus no standards of education or qualifications of experience demanded of those entering upon the practice of pharmacy.

There were drug stores, of course, but they were insignificant and unimposing, and had little about them to impress their value upon the public mind. A good drug store, in those days, had an annual sales volume of \$1,500 to \$2,500, and this in itself affords a fair picture of their economic plight and professional standing.

Pharmacy itself was not fully emancipated from the domination and control of the medical profession of that day. Physicians were both *medicos* and *pharmacists*, and many drug stores were operated by physicians as an adjunct to their medical practice.

In fact, as late as 1858, according to a report issued by the American Pharmaceutical Association, covering an extensive survey of pharmaceutical conditions, it was stated that the pharmacists of Baltimore were, with some striking exceptions, a rather incompetent group of drug vendors, and that a true sense of professional pride had not yet begun to play much part in the pharmaceutical standards of that time. Drug stores were simply stores, and what competitive advantage the pharmacist had over drug vendors came from the awe and superstition which surrounded his calling, rather than from any protection afforded him by law.

Drug stores were opened in response to personal likes and dislikes, and in accordance with personal predilections. One wanted to open a drug store and practice pharmacy, so he forthwith opened a drug store and practiced pharmacy. There were no legal or educational standards, and not the merest semblance of restrictions, limitations, prohibitions, regulations or restraints. It was a calling free and open to all, and it was engaged in by all and sundry kinds of people.

Influence of Pharmaceutical Education upon State Boards 21

There is little to indicate that there was any great enthusiasm for the School of Pharmacy when it was first established, and we can well surmise that it was looked upon more or less as a curiosity by the rank and file of pharmacists, who had not the remotest conception of the value of organized education in their field of endeavor.

It is probably true that there were not in all Maryland ten graduates of colleges of pharmacy when the Maryland College of Pharmacy was established. Having no educational background, the pharmacists of that day had no knowledge of what pharmaceutical education might be, and thus they were devoid of any capacity to visualize the benefits which might come from giving the drug store an educational foundation.

When boards of pharmacy were finally established in the 70's and 80's of the past century, they were made up mostly of men who had never attended colleges of pharmacy. The members had come up through the school of experience, which has always been somewhat intolerant of organized education.

Then, too, the teachers in colleges of pharmacy were frequently drug store proprietors, and thus were in competition with the drug store proprietors who made up the state examining boards. In those early days, a competitor was almost an enemy, as there were no local and state pharmaceutical organizations to bring them into contact with each other for their mutual benefit.

Thus, from the very outset the boards had an anti-college complex, which we must in all fairness admit persists, though with greatly depleted vigor, even to this day.

They looked with disfavor upon the teaching institutions, as pharmacy, so they visualized it, was something to be learned behind the drug store counter, and not something which could be taught in the rarified atmosphere of classroom abstractions.

Pharmacy meant the buying and selling of drugs, collecting them for drying and curing, storing them until properly aged, and then fabricating them into preparations of usable form. These various operations were extremely practical in form, and proficiency in them came from doing them over and over. It was experience, and experience alone which could confer competency, and experience could be obtained in one place, and one place only, and that was the retail drug store.

The boards of pharmacy in those early days simply ignored the existence of the colleges of pharmacy, and kept their eyes on the drug store as the source of pharmaceutical education and as the scene of that practical experience which, in due course, would make the pharmaceutical tyro a competent member of the craft.

As the years went on, however, the boards gave up the practice of ignoring the colleges of pharmacy and began to openly oppose them. Now, this opposition did not go so far as suggesting the abolition of the colleges, but rather was an expression of the conflict which existed between organized pharmaceutical education and practical drug store experience, and of the jealousies which had developed between the boards and colleges.

The colleges had shown that they did serve a purpose, and that they were quite capable of commanding a sizeable following among pharmacists themselves. The faculties of those days were composed of able men, men well qualified for pharmaceutical leadership and impelled by a vision and confidence which even to this day continues to exert an influence upon our splendid system of pharmaceutical education.

The board members, on the other hand, were drug store proprietors, and peculiarly conscious of their ability to deal in a practical manner with all the practical problems met with in the operation of a retail drug store.

As the prestige of the colleges advanced, the prestige of drug store experience advanced simply because of the emphasis placed upon them by their respective defenders.

The colleges were prospering, and gave ample evidence that they were becoming more and more essential in the pharmaceutical scheme. To some boards of pharmacy this was a challenge, and one which they accepted by paying more and more attention to the excellencies of drug store experience and less and less to the advantages offered by graduation from colleges of pharmacy.

Evidence is found in the fact that drug store experience was the only qualification demanded of prospective pharmacists during the first twenty-five years of operation under our state pharmacy laws. To emphasize this point, let it be said that college of pharmacy graduation was not demanded even in our beloved Maryland until 1920, and even when the law finally demanded college of pharmacy graduation as a requi-

site of registration, on and after 1920, the prospective pharmacist was still required to present satisfactory evidence to the board of pharmacy that, in addition to his college of pharmacy diploma, he had had four years of practical drug store experience, which was to be computed in accordance with the formula prescribed in the law itself.

As late as 1920 in this state, it would appear that college of pharmacy graduation was looked upon as not fully effective in the proper training of a pharmacist, and thus had to be supplemented and supported by actual experience behind the counter.

This statement should not be construed as indicative of any lack of leadership on the part of the faculty of the School of Pharmacy of the University, nor as affording any criticism for the excellence of its educational work. Nor is it to be construed as suggesting that the pharmacists of this state did not have confidence in and respect for the School of Pharmacy. It must be accepted simply as a continuation of the conflict between education and drug store experience, and as proof of the value which pharmacists in general gave to experience obtained in drug stores themselves.

Finally, the boards of pharmacy throughout the country began to soften, and in due course came to accept colleges of pharmacy as constructive factors in pharmaceutical education.

Education in general had become quite respectable, and the college professor, while still looked upon as something of an incompetent old mossback, was finally emerging to a position of great respectability in the estimation of the public. More and more persons were attending high school, and more and more high school graduates were pursuing higher education in our colleges and universities. Education was going through an evolutionary process, and boards of pharmacy were conscious of what was going on.

Then, too, the number of college of pharmacy graduates was ever on the increase, and thus a new educational concept began to assume greater force and influence in pharmaceutical affairs.

The medical sciences were no longer moribund, and a new alertness to the significance of scientific progress began to assert itself. College of pharmacy graduates were finding places on the boards of pharmacy, and the boards' philosophy began to be more and more expressive of educational prin-

ciples and more responsive to new educational pressures and demands.

Board of pharmacy examinations had already ceased to be patterned altogether upon the practical drug store experience concept and had begun to show the influence of professional pharmaceutical education. It was recognized that applied sciences must be predicated upon basic science, and that as pharmacy was largely an intermingling of applied science and professional technique, the examination would be more intelligent and thus more effective if it were grounded upon a sound knowledge of basic scientific fact and theory.

The changes in the attitude of the boards throughout the country was slow, sometimes tenaciously held back, but in the light of all the circumstances must be looked upon as progressive in its intentions and objectives.

About this time, there was established the National Association of Boards of Pharmacy, which included virtually all the state examining boards. Fortunately this national organization was given progressive leadership, and a leadership which visualized the benefits of pharmaceutical education as the one sure means of bettering the conditions of pharmaceutical practice.

From the very outset, this association has been cooperative with the American Association of Colleges of Pharmacy, with the result that the views of the boards have been brought to the attention of the colleges, and the views of the colleges have been brought to the attention of the boards.

From these contacts, there came a mutual understanding of the functions of each other, and thus a desire and a determination to give to the boards and to the colleges their respective places in the pharmaceutical scheme.

The boards became more and more conscious of their limitations with respect to matters within the field of the expert educator, and the colleges came to look upon the boards as the best qualified group to measure and evaluate practical experience and to determine what part it should play in the education and registration of pharmacists. No one could overestimate the value of the contributions to pharmacy which have come from the inter-relationships between the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy.

And thus, in Maryland, and particularly on this occasion,

it affords us some pride to know that many of the leading influences in both of these national groups have come from the School of Pharmacy of the University of Maryland, either as alumni or as members of its teaching staff.

Today we have reached the point where the conflict between boards of pharmacy and colleges of pharmacy has about disappeared. Drug store experience, too, has ceased to be important as a factor in the education and training of a pharmacist, and the significant thing is that the conflict has not subsided nor drug store experience waged a losing fight because of aggressive tactics on the part of the colleges, but rather because of the pressure of circumstances too profound to be withstood.

Pharmacy is looked upon as a public health profession, and as such must be supported and sustained by a system of professional education. It is universally accepted today that the training of the pharmacist is truly an educational matter, and that it should be left to colleges of pharmacy as a matter to be dealt with by professional educators.

Worthy of note, too, is the fact that among the most aggressive champions of higher educational standards for pharmacists will be found most of the members of state boards of pharmacy. It is a matter of historical record that the movement which later resulted in the establishment of the American Council on Pharmaceutical Education was originated in the National Association of Boards of Pharmacy which, as we have remarked above, is simply an organization of the individual state examining boards.

The boards of pharmacy share the view of colleges of pharmacy that the pharmacist should have a true university education in the various fields of chemistry, physics, bacteriology, pharmacology, pharmacy, biometrics, and the other sciences upon which public health so largely depends.

Not only should the prospective pharmacist be well grounded in the basic and applied sciences of his profession, but he should be equally qualified to take his proper place in community life and to discharge his responsibility to civic progress. In other words, the pharmacist must be prepared to serve both as a pharmacist and as a citizen, and in order to do this he must have had the advantages of organized education in both professional and cultural fields.

Boards of pharmacy today are almost entirely composed

of college of pharmacy graduates, and obviously they have brought to bear upon all the problems which confront them a broad educational outlook which in itself is an excellent tribute to the integrity of pharmaceutical education.

It is being seriously considered today that written examinations of the traditional variety be discontinued by boards of pharmacy, and that college of pharmacy graduation be accepted as conclusive evidence of a satisfactory completion of the course of study, and thus as conclusive evidence of the qualifications essential to entering upon the practice of pharmacy, so far as the purely theoretical and scientific subjects are concerned.

The proposition has been seriously advanced, and just as seriously received, that the boards confine their examinations to a searching practical examination, and leave the purely educational subjects to the educational experts, where common sense and experience have shown that it rightfully belongs.

The years elapsing since the founding of the School of Pharmacy of the University of Maryland a century ago have been momentous years, years in which custom has given way to custom, and a new order of life has been superimposed upon the wreckage of the old.

But while some of us may look longingly back at the days of crinoline and pantalettes, back to the warm-hearted hospitality of the less turbulent days, and may like to catch, even though ever so faintly, the fragrance of old lavender, we must admit that the world has progressed, and that with the giving up of priceless things have come other things equally priceless.

In the field of pharmaceutical education, we have seen the conflict between drug store experience and college of pharmacy training go through the process of orderly evolution, in which boards of pharmacy have not only lost their opposition to colleges of pharmacy but have become their most outstanding champions. One of the most intelligent characteristics of boards of pharmacy today is their frankness in seeing the limitations which surround them, and their desire to find a place in the pharmaceutical educational system more in keeping with their peculiar qualifications and more in response to sound educational principles.

The journey from 1841 to 1941 has been hard, dangerous,

sometimes uncertain and confused, but it has always lead in the right direction, a fact nowhere better exemplified than in the field of pharmaceutical education, and particularly in the development of the educational concept which has characterized the School of Pharmacy of the University of Maryland.

To the School of Pharmacy of the University of Maryland, pharmacy and society owe much. As one of her loyal sons, I am content to sit at her feet, confident of still better things yet to come, not only to pharmacy but to the boundless future in which pharmacy, with her thoughtful care and direction, will play an honorable part.

Pharmacy's Contribution to Science*

GEORGE DENTON BEAL

Assistant Director, Mellon Institute of Industrial Research, Pittsburgh

"Some time ago, in writing on "The American Way in Pharmacy",† I made the statement that, "Pharmacy in America was fortunate because it grew at a time when medicine was in the mood for becoming more scientific". Practical therapeutics has been influenced by the pharmaceutical profession through discoveries of the character and the constitution of drugs and of the manner of dispensing them. During the same time the therapist and the pharmacologist have turned practical pharmacy from the compounding of botanical drugs to the isolation of their active principles, the synthesis of complex organic molecules, and the exploration of the animal and vegetable kingdoms in search of the agents that police life functions.

Usnea, that is, moss from the skull of a man that had died by violence, which became official in 1650 in the first revision of the London Pharmacopoeia, is not recognized today by the United States Pharmacopoeia. But citric acid and calcium gluconate, both official in the current U.S.P., are now produced by the growth of certain molds on glucose. The dried and pulverized reptiles and other horrible derivatives of the animal kingdom are no longer drugs, but during the present

*Read at the Academic Convocation at the Centennial Celebration of the School of Pharmacy of the University of Maryland, June 5, 1941, at Baltimore.

†Ind. Eng. Chem., Vol. 31, 531-9, (1939). Industrial Editor.

century the balance wheels of life have been traced first to individual organs and glands, then to the output of these glandular laboratories and finally to chemical groupings that can be brought together in beakers as effectively as in the thyroid or adrenal capsule.

Chemistry had three experimental origins, the processing of drugs, the industrial arts, and the more speculative type of experimentation exemplified by the search for the "philosopher's stone". Because the art of the apothecary became, through human need, widely established as a profession, it is not surprising that the scholarly and inquisitive apothecaries devoted themselves extensively to experimentation. The result was that when chemistry was largely explorational, many of the fundamental discoveries, including some of the elements, were made by apothecary chemists.

In addition to the work of the apothecaries in establishing chemistry as a science through their discoveries of important and fundamental chemical substances, the remarkable results produced by drugs led other chemists to attempt to isolate and identify their active constituents, then establish their structure, and finally attack their synthesis. Pharmacy was particularly stimulating to organic chemistry, which is today probably the most extensive branch of chemistry. More than one great industrial development of organic chemistry stemmed from the study of drugs. An especially noteworthy example was the production of the dyestuff mauve through the oxidation of aniline. This important discovery by Sir William Perkin, who was attempting the synthesis of quinine, laid the foundation for the world's synthetic dyestuff industry, which has done more than anything else to establish chemistry as a mighty industrial force.

Because of my own interest in chemistry I have singled out this science as a leading beneficiary of pharmacy, but others will tell you how systematic botany received its great impetus from the need for classifying and identifying the vegetable drugs upon which so much of the practice of pharmacy as a healing art has been based. And in the same way others will relate how pharmacy and medicine together have explored the functions of glands, secreting and ductless, so that today we have ways of replacing from the outside the services of those glands that have tired of their function and allowed disease to take possession of the body.

American pharmacy received from the old world a great deal of its fundamental science, a respectable part of its *materia medica*, and many of its traditions. But pharmacy thus established had to grow independently because the pioneering spirit of the American people promptly scattered them over a continent where they had to depend in every way upon local resources. The aborigines, through centuries of trial and error, had discovered the curative value of many native plants. Many of these have later been discarded, but there are a few from the New World that probably will have a place in medicine as long as vegetable drugs are recognized by physicians.

It has thus come about that the first era in American pharmaceutical industry and practice was that of botanical exploration. This was the era in which your college began its work. There followed in succession the mechanical period, when machines began to replace hand operations; the era of scientific control, when chemical methods of assay came into being; the trend to biological products, including those of bacterial origin; and finally the synthetic period, when chemical reconstructions of molecular groupings began to take the place of the natural drugs with their high contents of inert materials. With this progression we have come to associate the names of Baltimoreans, including Sharp, the Dohmes, elder and younger, Caspari, Engelhardt, Abel, and Dunning.

To my mind probably the greatest contribution of pharmacy to science in general was its early establishment of scientific methods of control and research in the operations of industry. Credit for the first control laboratory is commonly given to the steel industry, but the drug laboratory was contemporary with the former, and drug assaying led into research in a way not contemplated a half-century ago by other American industries. For one thing, the laboratory in the steel mill was definitely a routine laboratory in which only elementary analyses were conducted, while the pharmaceutical laboratory dealt with many crude and finished materials of a delicate character in numerous and changing combinations.

The fine art of drug standardization became an industrial science while the other laboratory applications of chemistry were almost altogether academic. The United States Pharmacopoeia of 1880 was compiled as a useful laboratory guide, and even those of 1860 and 1870 show the influence of lab-

oratory science upon professional activities. The first United States Pharmacopoeia, of 1820, and the first and second revisions thereof were prepared entirely by medical editors, but the colleges of pharmacy of 100 years ago were of so much assistance in preparing the second revision that the convention of 1850 included the colleges of pharmacy as constituent members. Continuing joint representation to this day, the U. S. Pharmacopoeia is unusual among pharmacopoeias because of the democratic representative character of the convention and the revision committee, and because of its legal status while it is in no sense under governmental control.

Pharmaceutical manufacturing operations have developed in just as scientific a way as the control operations. There are few of those which are regarded as within the province of the chemical engineer that were not pharmaceutical in their origin or are not in use by pharmacy today. Whether it be grinding, extraction, filtration, vacuum evaporation, or drying, the apparatus used today by the chemical engineer is at most only more elaborate than that used many years ago by retail pharmacists. The ingenuities that have been shown in the development of pharmaceutical processes have come from the recognition of the instability or the inertness of many of the constituents or drugs.

In the presentation and publication of research data pharmacy has made a notable record. Some of the world's best known scientific journals began in the field of pharmacy, only to enlarge their scope as pharmaceutical chemistry became but one of the branches of the larger science. The chemical papers presented at the early sessions of the American Pharmaceutical Association were the first to be presented to any scientific organization of open membership that exists to the present day.

When speaking of the contributions that pharmacy has made to science one is justified in considering with the progress inside the profession, that which is stimulated on the outside. Much of the energy devoted to research in chemistry, physiology and bacteriology today is pointed directly at the professions of pharmacy and medicine. Together these researchers have had at least three aims. They are, the reproduction of naturally occurring compounds, the manufacture of compounds of equivalent or superior activity from which certain faults should be absent, and the discovery of

new drugs of unusual properties. In these three groups you will recognize the positions occupied by camphor, procaine, and sulfanilamide. The situation is that among all of the possibilities for the use of newly discovered chemical substances there is none so spectacular as the discovery of a new specific in the field of medicine.

Scientific research in the multitudinous branches of pharmacy, wisely makes use of the services of many non-pharmacists. It includes much in the realm of pure science as well as in the applied branches. It directs itself to the usual types of industrial problems, such as studies of raw materials, manufacturing processes, improved methods of standardization, and methods of stabilization. But it also branches out to take in all of the possible new lines of attack on the problems of disease control that any branch of science may suggest. The greatest difficulty encountered is a lack of balance between the actual laboratory developments and the clinical investigations that must follow. The need right now is for a research agency that can secure the prompt evaluation of a newly proposed therapeutic agent, both experimentally and in such a fashion that there may be a complete correlation with the laboratory in which the product was obtained, in order that its further work may be directed.

The key to the growth of pharmacy as a profession and a science lies in the strength of its organization for education. The need for a formal organization and a formal educational program came to a head with the establishment within a period of twenty years of our four great eastern schools, and shortly thereafter schools in Cincinnati and St. Louis. These colleges had in their faculties the authors of the textbooks and other compendia that established the profession independently in this country. Their graduates staffed the drug stores and the drug factories, and from their ranks came the inspiration for the extension of pharmaceutical training across the country. Therefore these same schools were the nurseries in which the modern science of pharmacy, and the scientific aspects of the practice of pharmacy, were brought along to manhood. While pharmaceutical education was in transition from a one-year course with mediocre entrance preparation its research contributions did not match those of the days when the practice of pharmacy meant the merchandising of drugs and chemicals and nothing else. But our modern edu-

cational program, putting pharmacy back on a full collegiate basis, is already proving a great stimulus to the performance of pharmaceutical research by pharmaceutical hands.

Let us summarize what pharmacy has done in America to make itself strong and to assure its scientific position. It began self-contained and self-sufficient because of the needs and limitations of pioneer life. It took what it needed of old-world science and added a new *materia medica* from a land of great botanical richness. It pioneered in adapting and applying engineering methods to its industries. It established a nationwide system of strong professional education, and raised its own standards when necessary. It cooperated in, when it did not initiate, the passage of needful regulatory legislation. It has largely made its own standards of conduct, particularly with reference to standards of strength, quality, and purity for drugs and medicinal preparations. It has literally lifted itself by its bootstraps and it is only through the inspiration and example of such men as those who founded and have carried on this Maryland College of Pharmacy that it has been able to do so.

The Drug Industry's Contribution to Medical Care and to the Progress of Science*

ROBERT P. FISCHER

Secretary and Chief Chemist of the Board of Pharmacy of the State of New Jersey
Member, New Jersey State Board of Health

On the occasion of the one hundredth anniversary of the founding of the Maryland College of Pharmacy it would perhaps be fitting to review in detail the development of the drug industry of the United States from its humble and more or less individualistic beginnings to its present mechanized and highly specialized state. However, time permits of only a cursory review and the recording of a few landmarks in the century of progress.

In 1841 the retail pharmacy was still the primary source of prepared and specially compounded medicines. Progress in

*Address given before the Scientific Session, Centennial Celebration, School of Pharmacy, University of Maryland, Baltimore, Maryland, June 4, 1941.

Drug Industry's Contribution to Medical Care and Science 33

the basic sciences and in the methods of medical care since that day has been so rapid that the individual pharmacist, although more highly educated and more scientifically trained, must of necessity function in a more restricted sphere. In other words, pharmacy, as well as medicine, has become more highly specialized.

One of the first steps toward specialization in modern medicine was the early division of labor between physicians and pharmacists. With the advance of medical science, less reliance was placed on the incantations and mystical brews upon which the "medicine man" of an earlier day had depended for his healing art. In the course of time, the preparation as well as the use of drugs and medicines reached a scientific basis, and the practice of pharmacy itself became a specialized field of medical care. Pharmacists today occupy not only the important position of producers, compounders, and distributors of drugs and medicines, but they also originate drugs based upon specifications of the medical profession.

Many functions of the pharmacist of 1841 have been absorbed by the drug manufacturer of 1941. The individual apothecary no longer makes up in his laboratory all the pills, elixirs, tinctures and extracts of an earlier day, nor does he attempt to produce the multitude of newer preparations which physicians prescribe today. The professional function of the pharmacist has not changed, but the base of many operations has been moved from the laboratory of the drug store to the production line of the manufacturing house.

The early apothecary, working in his shop, was manufacturer, compounder, and dispenser, all in one. There was no division of labor in the modern sense. As a result, some of these apothecaries became earnest research workers, delving into the mysteries of chemistry and endeavoring to ascertain the active principles of the crude drugs then in use. Carl Wilhelm Scheele, who discovered oxygen, chlorine, hydrofluoric and prussic acids, and glycerin; Frederick Sertuerner, who discovered morphine; Pellettier and Gaventou, who discovered quinine; and others who by important discoveries in inorganic and organic chemistry laid the foundation to the vast synthetic chemical industry, were all pharmacists either in their early days or throughout their lives. In more recent times, pharmacists ambitious to carry on laboratory research have drifted quite naturally into the specialized fields of

science such as chemistry, pharmacology or bacteriology and have become identified with these and other branches of medical science rather than with pharmacy, in its more restricted activities.

"From Materia Medica To Pharmacology"

At the time of the founding of the Maryland College of Pharmacy there was in existence a very extensive list of drugs with a background based upon clinical rather than scientific evidence of usefulness. "The long struggle between the Galenists, who believed that all the valuable remedial agents were the products of plant or animal origin, and the Alchemists, who believed that the only useful remedies were minerals that had been refined in their retorts and crucibles, had been compromised long since, and the materia medica of that day included large numbers of substances from both sources,"¹ with synthetic organic compounds gradually coming into the picture.

"If we ask how the various drugs in the materia medica of that day came to be there", says Dr. Carl A. Dragstedt in his delightful little essay entitled "From Materia Medica to Pharmacology,"¹ "the answer may be illustrated in part as follows: Cinchona Bark was there because an earthquake threw some cinchona trees into a lake adjoining a village, and a sick Indian, unable to walk far enough to get better water, was forced to drink the bitter water from the lake and thereupon got well. Ergot was there because the European peasants were forced by economic circumstances to eat rye bread made from tainted flour. Digitalis was there because an inquiring physician listened to an old woman's story. Atropine was there because a pharmacist's apprentice rubbed his eyes while he was filling a prescription. Strophanthus was there because the botanist on David Livingstone's expedition kept his toothbrush in his pocket, where it got contaminated with an arrow poison he had obtained from the natives. Epsom Salt was there because a farmer had a spring on his property, from which his cattle refused to drink. His curiosity persuaded him to try it and its pharmacological effects were promptly called to his attention."

Today the pharmacologist is relied upon to supply accur-

¹"From Materia Medica to Pharmacology" by Carl A. Dragstedt, M.D. Northwestern Bulletin, Vol. XLI, No. 3, November 11, 1940.

ate data on the action of prospective drugs, based upon animal tests in the laboratory, in advance of their clinical trial upon man. Medicines are literally made to order but not in the sense of merely mixing a number of drugs to accomplish some specific therapeutic action, as was the case with the shotgun prescription of an older day. By means of highly refined processes in the laboratory of the organic chemist, compounds of complex structure with a maximum of specific therapeutic action and a minimum of undesirable side actions are built up from their elements. Such achievements are the result of the coordinated effort of pharmacologists and chemists, many of whom carry on their activities in the research laboratories of the drug industry.

The conquest of pain, the prevention of infectious diseases by the destruction of disease-producing bacteria outside of the body and the development of immunizing sera and preventive vaccines, the soothing of excited nervous systems, the cure of diseases brought on by nutritional deficiencies, and the direct destruction of microorganisms and their toxins in the bloodstream have all been accomplished to a greater or lesser extent in man's continuous fight against disease. The chapters of medical history which record the progress in this field are still open to revision but occasionally there appears a gifted writer like Slosson, or DeKruif, or Silverman who can dramatize the simple story of patient and laborious research in university, state, industrial, or research foundation laboratories, which, through the interchange of information by means of our modern systems of reporting and recording, finally lead to the construction of what Milton Silverman has so aptly referred to as the "Magic in a Bottle"², emanating from the laboratories of the pharmaceutical manufacturer and the prescription room of the pharmacy to bring relief or cure to sufferers everywhere.

The Conflict Between Science and Commerce

While it is possible to write a fascinating story of the contribution of the drug industry to the progress of medical science, there have been and are unfortunate limitations to these contributions because of the dual nature of these enterprises. On the one hand, splendid laboratory facilities for

²The Macmillan Company, New York

production are made available and competent scientists are engaged in research and developmental work. On the other hand, the fact that stockholders look for dividends from their investments has a tendency to limit the extent of altruistic effort. Furthermore, the clinical experimentation which is essential to the establishment of the real value of a drug cannot be or, at least, has not been done in the drug industry. It has been necessary for individual manufacturers to establish their own clinical contacts. Some have done this for years through friendly private practitioners or hospital contacts. Others have done it by creating fellowships at medical centers or establishing foundations for clinical research. Progress in cooperation between some of the better established and well financed units of the drug industry and outstanding clinicians has been very marked in recent years and there are signs of the possibility of more intimate relationships between producers of drugs and recognized clinicians in the future which will undoubtedly promote progress in this field.

Obviously, the producer of drugs is also expected to be a source of information regarding them. Before a curb was placed upon the enthusiasm of the advertising departments of the drug industry by such agencies as the Council on Pharmacy and Chemistry of the American Medical Association and the Food and Drug Administration even the most conservative members of the industry were apt to be extravagant in their claims of therapeutic efficiency for products bearing their own label. It was this situation which undoubtedly brought forth such criticism as was voiced in an address on "Chauvinism in Medicine" delivered before the Canadian Medical Association September 17, 1902 (39 years ago) by the late Dr. William Osler, then professor of Medicine at Johns Hopkins University. He paid his respects to certain segments of the drug industry in the following paragraphs:

"The practitioner must be kept out of the clutches of the arch enemy of his professional independence—the pernicious literature of our camp-followers, a literature increasing in bulk, in meretricious attractiveness and in impudent audacity. To modern pharmacy we owe much, and to pharmaceutical methods we shall owe much more in the future, but the profession has no more insidious foe than the large borderland pharmaceutical houses. No longer an honored messmate, pharmacy in this form threatens to become a huge parasite,

eating the vitals of the body medical. We all know only too well the bastard literature which floods the mail, every page of which illustrates the truth of the axiom, the greater the ignorance, the greater the dogmatism. Much of it is advertisements of nostrums foisted on the profession by men who trade on the innocent credulity of the regular physician, quite as much as any quack preys on the gullible public. Even the most respectable houses are not free from this sin of arrogance and of ignorant dogmatism in their literature. A still more dangerous enemy to the mental virility of the general practitioner, is the "drummer" of the drug house. While many of them are good, sensible fellows, there are others, voluble as Cassio, impudent as Autolycus and senseless as Caliban, who will tell you glibly of the virtues of extract of the coccygeal gland in promoting pineal metabolism, and are ready to express the most emphatic opinions on questions about which the greatest masters of our art are doubtful. No class of men with which we have to deal illustrates more fully that greatest of ignorance—the ignorance which is the conceit that a man knows what he does not know; but the enthrallment of the practitioner by the manufacturing chemist and the revival of a pseudo-scientific poly-pharmacy, are too large questions to be dealt with at the end of an address."

Today the literature issued by pharmaceutical manufacturers, although not perfect, clearly shows the restraint imposed by the more conservative scientific element within the industry and the effects of regulatory procedures.

Goodman and Gilman, in their recently published text entitled *The Pharmacological Basis of Therapeutics*³ state that "a drug may be broadly defined as any chemical agent which affects living protoplasm, and few substances would escape inclusion by this definition."

For control and regulatory purposes the definition of the term drug is much more prosaic and circumscribed. Our latest Federal law states that "the term drug means articles recognized in the official United States Pharmacopoeia, official Homeopathic Pharmacopoeia of the United States or Official National Formulary, or any supplement to any of them; and articles intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease in man or other animals; and articles (other than food) intended to affect the structure

³The Macmillan Company, New York

or any function of the body of man or other animals; and articles intended for use as a component of any articles specified in the foregoing; but does not include devices or their components, parts or accessories."

A study of these two definitions is a good example of the difference between the approach of the scientist and the policeman to the problems of the drug industry. These definitions also furnish the basis for a text on the drug industry's contribution to the progress of science as applied to medical care. Acceptance of the definition that a drug is "Any chemical agent which affects living protoplasm" immediately established a basis for scientific research in the drug industry which is deeply rooted in biology, physics and chemistry. It also establishes the basis for the support of research in pure as well as applied science by the drug industry. The legal definition and the Food, Drug and Cosmetic law itself and particularly the regulations promulgated by the enforcement agency, furnish the best indication of the abuses which have crept into the drug industry, for they have been devised to curb these abuses.

Origin of the Drug Industry

The oldest pharmaceutical manufacturing establishments in the United States had their origin in retail pharmacies. It is interesting to trace the history of these establishments, pioneered either by physicians or pharmacists or pharmaceutical chemists who became quantity producers of pills, tinctures, fluidextracts, extracts and other dosage forms of the drugs of their day and then, by a combination of business acumen, alertness to the progress of medical science, ingenuity in devising production equipment and a vision of improved service to humanity, grew to be important allies of the medical profession in the fight against disease.

Of course, there are manufacturers of drugs who have never passed beyond the stage of becoming merely large scale producers of ordinary combinations of dosage forms of drugs and who have no ambition to move into a more productive sphere. Others have seen in improved and increased facilities the opportunity for extending their service to humanity by collaborating with those engaged in extending the frontiers of the medical sciences, chemistry, pharmacology, bacteriology and immunology, as applied to medical care.

To these far-seeing individuals we owe the splendidly equipped research laboratories of the drug industry which have sprung up in recent years to take their place in the advancement of fundamental research and to aid in taking the long step from the first laboratory recognition of the possible existence of a new therapeutic agent to its ultimate distribution throughout the world in a pure, stable, and accurately standardized form.

Adrenalin, insulin, thyroxin, liver extract, the vitamins and hormones could not have been made as readily available to the sick in all income groups without the ability of the drug industry to promptly place a laboratory curiosity on a mass production basis in forms for ready and safe administration.

If we take for granted the well-known contributions of the pharmaceutical industry to the engineering of large scale production and to the economics of production, we may pass to the broader relations of the industry to the general progress of science and to the improvement of medical care.

Development of Drug Standardization

Perhaps the first important contribution of the pharmaceutical manufacturing industry to scientific progress as applied to medical care was the effort to standardize the potency of the drugs supplied by devising laboratory methods of estimating their strength and purity. Possibly the urge toward standardization was as much a matter of self defense and economics as it was a matter of interest in the consumer. A manufacturer who purchased quantities of belladonna root or leaf having a high alkaloidal content or digitalis leaf having a high potency, could better protect his reputation and possibly profit in dollars if he knew the actual alkaloidal or glucosidal content of the drugs he purchased and was therefore in a position to adjust his preparations to a given standard. The perfection of methods of estimating drug constituents was, therefore, subject to a double incentive. In the first place there was the achievement of uniformity in the interest of proper dosage and effect upon the patient and, secondly, there was the economic advantage of producing increased quantities of finished drug products from high potency raw materials.

Manufacturing pharmacists have contributed methods of standardization of drugs ranging from the simple determina-

tions of quantity of extractive, through chemical assays of content of alkaloidal and other active principles to the more complex biological assays for such drugs as ergot, digitalis and strophanthus, and antitoxic sera, vaccines, vitamins and hormones. The assay and standardization of drug products is a comparatively recent development. It did not receive serious consideration until the start of the present century. Since the passage of the first Federal Food and Drug Act of 1906 the contributions of the analytical laboratories of drug manufacturers to the inclusion of satisfactory standards for drugs in the U. S. Pharmacopoeia and National Formulary constitute a major chapter in the history of drug standardization. The methods devised cover physical, chemical and biological tests and reflect the ingenuity of those engaged in the work of evaluating the quality of raw materials and the accuracy of manufacturing methods.

The contributions to drug standardization made by individual laboratories and the workers in those laboratories could, of course, be cited. They are recorded in the chemical and pharmaceutical journals and in the circulars of the subcommittees of the U. S. Pharmacopoeia Revision Committee and the National Formulary Committee. These records indicate a never ending search for more specific, for simpler and for more accurate methods of measurement of activity, identity, purity and strength of the products offered for use in the diagnosis, prevention and cure of disease.

The establishment of control laboratories in the larger manufacturing houses has spread to such an extent as to include practically every concern which produces drugs in any quantity and it has led to arrangements for control by private analytical laboratories in cases where the operations are not sufficiently extensive to warrant establishment of a control laboratory within the manufacturing plant itself.

Facilities for biological assaying required of drugs like digitalis, aconite, epinephrine, ergot, pituitary, vitamins and hormones are less frequently encountered in manufacturers' laboratories but care is taken to provide for such service through contact with competent university or private laboratories.

Regulatory provisions under federal and state laws are such today that manufacturers simply must provide for control of the products they place on the market. Once a control

laboratory has been organized, it takes on duties which include not only the testing of raw materials and finished products, but also the protection and improvement of manufacturing processes and techniques and studies of methods of preservation and packaging, all of which contribute greatly to the progress of pharmacy and the care of the sick, especially when there is interchange of information between the various manufacturing laboratories such as is provided through the drug manufacturers' associations.

Research in the Drug Industry

A somewhat different line of activity results from embarkation upon what may be termed "pure research", which is undertaken in the expectation that there may be developed some new drug or modification of an existing drug which will bring to the producer an exclusive proprietorship either as the result of patentability or priority of manufacture. It is in the development of research departments in the drug manufacturing industry and the products of such researches that competitive effort is today most greatly manifested. But no drug developed in a pharmaceutical manufacturing laboratory can reach any degree of prominence without the cooperation of the medical profession.

Chemical laboratories can produce thousands of compounds while pharmacologists are testing a hundred. Clinicians are skeptical about the use of any drug until laboratory findings on suitable test animals have clearly established its safety and possible effectiveness. It was the lack of due care in establishing the complete safety of new drugs or dosage forms of such drugs which led the federal government to enact into a law a restriction on the marketing of new drugs until after an application has become effective. This application made to the Food and Drug Administration must, in order to become effective, be accompanied by sufficient clinical data and information as to control to establish its complete safety for use as prescribed.

Viburnum, guarana, coca, jaborandi, grindelia, saw palmetto, convallaria, cocillana, kamala, cascara sagrada, tonga and ephedra are a few of the vegetable drugs introduced to medicine at various times in the past century chiefly on the responsibility of manufacturers and without governmental supervision. Many of these drugs hark back to the days of

"*materia medica*" and empiricism. Only a few would pass muster if introduced in the era of pharmacology".

With the advent of serums, vaccines, bacterial vaccines and potent chemotherapeutic agents administered parenterally, the United States Public Health Service was assigned the duty of passing upon the facilities of the producer and the safety of the product under a Federal licensing system.

The subsequent development of potent chemotherapeutic agents for administration by mouth or parenterally, such as the sulfonamide derivatives and the careless dispensing of sulfanilamide, dissolved in diethylene glycol, with the resultant loss of life, gave emphasis to the need of some form of control over the promiscuous production and distribution of dangerous drugs. The new drug section of the Federal Food, Drug and Cosmetic Act is the answer.

New Drug Control

Whenever a new drug with more or less specific therapeutic properties is developed, a host of imitations, variations and substitutes is made available from competing laboratories. In one sense this is not detrimental because the work of many laboratories concentrated upon the production of a drug whose efficacy has been established may well lead to improvements which will enhance its value in the hands of the medical profession. In another sense, however, senseless duplication purely for the benefit of the individual producer complicates distribution and results in duplication of stocks, confusion on the part of the practicing physician, and increased expense to the sick.

Under the patent laws of the United States it is possible to patent drugs both as to process and product. Attempts have been made to rid our system of its abuses of patenting drugs and continuing proprietary rights in them by skillful use of the trade mark laws. To some extent this has been accomplished through public pressure to make new discoveries for the treatment of disease available as promptly as possible after announcements of the discovery of such drugs have been made in the public press.

Patents have been issued for some drug products or processes which have yielded their holders handsome revenues and have more than repaid the investment in research and clinical testing. On the other hand, it is said of the develop-

ment of certain sulfonamide compounds that manufacturers who pioneered in this field have not been able to recover the expense of their researches in the production of these products due to premature reduction in costs to the consumer as a result of keen competition. Where the patent rights are shared by several firms and where the raw material is made available without license to manufacturers generally a product quickly loses its classification as a proprietary "specialty". This is all to the good for the consumer but rather hard on the producer, who may have sunk considerable sums into the laboratory work and clinical testing involved in establishing the value of the drug.

Social Aspects of the Industry

Considerable discussion has occurred at various times about the advisability of dedicating all patents affecting the cure of disease, to the public. This is in line with the discussion of the status of the drug industry as a public utility rather than a source of private profit. Those who argue that the sick should not be exploited either by the medical profession or by the drug industry, or by any other group that profits from medical care, hold that "nationalization" of the drug industry, which is a less significant term perhaps than "socialization", should be accomplished in the public interest. Definite expression of this concept is given in the volume entitled "Health Insurance"⁴ by Louis S. Reed, an economist for the United States Public Health Service. He states that, "nationalization of the industry would bring the following advantages:

"(1) Only drugs and preparations of value in the prevention and treatment of disease would be produced and made available to the medical profession and the public.

"(2) By elimination of duplicate preparations and competitive and useless advertising and sales promotion activities, costs of manufacture and distribution could be lowered considerably.

"(3) At a cost of a fraction of the amount saved through the elimination of present wastes, sound information could be given the public on the care of health.

"(4) Announcement to the medical profession of new drugs and preparations would come from scientific and disinterested sources.

"(5) There would be more and better organized pharmaceutical research than at present."

"The purpose of the drug industry", says Dr. Reed, "should

⁴Harper and Brothers, New York

not be to provide incomes for the producers. Its purpose should be to provide the public and the medical profession with drugs and medicines needed for the prevention and cure of sickness, at the lowest possible cost. For their efforts in this direction producers are entitled to a reasonable return. Considered from this viewpoint the drug and medicine industry as now conducted is an economic monstrosity. The production and distribution of drugs and medicines is now conducted in a fashion as idiotic as trial by combat, as irrational as the treatment of disease by witchcraft and devil exorcism. Were this essential activity to be rationally organized, the country's drug bill could be cut by 65 per cent, with an appreciable gain in health, lowered sickness, and less mortality."

That the drug manufacturing industry itself is none too well satisfied with the conduct of its own members may be gleaned from the following resolution passed by the American Drug Manufacturers Association:

"RESOLVED, By the members of the American Drug Manufacturers Association in annual convention assembled, That they subscribe and adhere to the following principles as an expression of a Code of Ethics:

"First: The essence of ethics is honesty.

Second: Whatsoever ye would that men should do unto you, do ye even so unto them.

"And **WHEREAS,** It is the desire of the membership of the American Drug Manufacturers Association to go on record with reference to certain definite practices, be it

"RESOLVED, That it is the sense of this Association that it is unethical:

"First: To knowingly produce an imitation of a specialty offered by a competitor; therefore, the marketing of a colorable imitation of any competing product is to be highly condemned.

"Second: To pass off the products of one manufacturer for those of another by imitation of products, labels, packages or special designs, by simulation of advertising or trade names; by the appropriation of the results of a competitor's research, ingenuity, labor and expense, thereby avoiding costs otherwise necessarily involved in production.

"Third: To make, as a private formula, any product which a salesman or customer may request as an imitation of a specialty introduced by another manufacturer.

"Fourth: To permit salesmen to offer a product as a substitute for a specialty introduced by another manufacturer.

"Fifth: To make, or permit employees to make, false or disparaging statements respecting competitors' products, their business, finances, credit or integrity, and

"Be it further **RESOLVED,** That the members of this association denounce and condemn in the strongest terms any form of piracy or the practice of duplication in color, description, or design, that would tend

Drug Industry's Contribution to Medical Care and Science 45

to deceive the buyer or the public so as to lead them to believe that in purchasing said imitation they were getting the original article, since a manufacturer, who through genius, advertising efforts or reputation has built up a trade on any article so that it has become generally known by its color, design or construction, though it may not be patented, is entitled to the said consideration and reward as though it were in fact patented."

Enough has been said in this paper to show rather clearly that the drug industry has kept pace with the progress of the times and that it is conducted by human beings who are subject to all the ambitions, emotions and fallibilities common to the genus homo. Industrially it ranks high among the producers of wealth in the United States. Professionally, at times and places, it reaches the highest concept of the ethical ideal in the practice of medicine. Its place in the field of medical care is made most difficult because its services are rendered through products rather than personal ministrations. Yet its leaders have caught the significance of the scientific approach to the conquest of disease and there is abroad in the industry the spirit so well portrayed in the closing paragraphs of Silverman's fascinating story of the development of quinine, morphine, cocaine, digitalis, the barbitals, the vitamins, the hormones and the sulfonamides.

"Some day", says Silverman, "there will be more chapters to this story of drugs. Scientists have invested six thousand years in their search for good drugs, but men still sicken and die needlessly. The scientists certainly won't stop now.

"Even today, these stories of the future are being lived. Somewhere is an old physician, weary from years of ministering to his patients, who has found a strange clue, 'It is odd', he writes to a university scientist, 'that an old pet medicine of mine should cure so many patients. How about driving up here for the week end?'

"Somewhere is a man who says, 'If I could only get a nitrogen inside that phenanthrene nucleus and then couple some acetyl groups on the double bonds and then.....'

"Somewhere someone is wondering, 'Now what would happen if I'd shoot some of that new extract into monkeys instead of guinea pigs. Monkeys are more like men.'

"Somewhere some young fellow is pleading into a laboratory telephone, 'I know, darling, and dammit I'm sorry about dinner. But I want to start one more batch of mice. I think I've got something . . .'

"Somewhere tomorrow's triumphs are in the making, as fantastic as a fairy tale or as simple as ABC. Some day they, too, will be magic in a bottle."⁵

⁵"Magic in a Bottle". The Macmillan Company, New York

College Education in Its Relation to the Defense of America and American Ideals*

GILBERT W. MEAD

President, Washington College

Every nation in the world today is at war. A few of us are not, but our ideas are at war. Our political and economic principles are at war in every quarter of the globe. In a day like this, when a pin-point island in a vast expanse of sea may become a plane base—when the frozen latitudes of the far north become an economic and a military objective, it is no wonder that we feel the pressure of an emergency. Since this has been proclaimed a total war wherein fundamental points of view, political opinions and philosophies are clearly ranged against each other to contend to the death, America sees that to protect the American way of life in this total war, we must prepare a total defense. This is a sufficient reason for relating everything we do, and the means by which we do it to defense. Today, my problem is to speak of this relation as education—particularly in the colleges—is tied in with this unanimous movement to a total defense of America and its ideals. It is to us, just as it is to a factory owner or manager, a very real and concrete problem.

We need not now detail at length the reasons why a total defense is necessary to America. It presses in on us from every side. We have learned that the present struggle is not so much one between nations and political entities as it is a war between ideas; between conflicting philosophies, between ideologies as vastly separated from each other as is possible. We see it clearly as the struggle between the democratic and the totalitarian ways of thinking of and dealing with others; in fact of life itself in all its most minute ramifications. And just because these two ways are so diametrically opposed to

*An address delivered at the Centennial Celebration of the School of Pharmacy of the University of Maryland, June 5, 1941, at Baltimore.

each other, their conflict is bound to be stupendous and their determination to resist each other an inflexible one. The mutual opposition is total; the repelling forces are total; the adamant opposition to each other is total. The war has been proclaimed a "total war"; the defense must therefore be a total defense.

The democratic ideal, which is best exemplified by the development of the American state during the last two hundred years, cannot abide the thought of domination by the totalitarian forces now sweeping the world. We see daily what it has meant to the small nations of Europe as the heel of the conqueror has been set upon their necks. It has meant death and wanton destruction, the slavery of enforced labor and debased currencies, the physical and mental tortures of the prison and concentration camp. It is meaning poverty and starvation of the producers of food so that the conquerors may be nourished and strengthened for wider conquests. It has meant from the first the extermination of the individual, whether military or civilian; the death of his initiative if not of his body, the end of his right to independence of speech or of any action, down to the least movements of his daily doings. The enslavement of the citizen is as certain among the common people of the aggressor nations themselves as it is among the folk who have been conquered.

Nor can we overlook the sad thought that this totalitarian menace rests upon the idea of the supremacy of one group over another—which means inevitably the enslavement of all who do not share in the rulers' ultimate ideals. It means and has meant from the beginning, the inculcation and the fostering of racial hatreds, the stimulation of group conflicts and the suppression by death, prison and torture of the members of any group whether economic, political, racial, religious or intellectual, whose extinction would forward the aims of dominant minority.

So it is and has been in this "total" war in Europe. Have we any reason to believe it would be any different if America were to come under such a ruling power? We know it would not be otherwise with us if we permitted it to happen here. Against this our defense must be total, as the peril will be total upon us if we permit it to come.

We are constantly reassured by the opinions of our military experts that an actual military invasion of continental Amer-

ica, at the worst, only a remote possibility. Possible or not, we must remember that an armed invasion, in this new and strange sort of war is the last manifestation of the desire to conquer. It is preceded by an invasion of ideas, the sowing of discontent and suspicions, the quiet subversion of ideals and opinions. This has been so in many recent instances we can all cite. Have we reason to believe that it is different with us? The sabotaging of intellects as a prelude to economic and political conquest is now the established technique. Against this our defense must be total, as certainly as that we need the physical and material defense of airplanes, tanks, guns, food, and munitions.

"Total defense", then, means just that—no less. We must provide materials. We must provide men. We must preserve morale. With adequate attention to these three fields, we will feel prepared. Nothing must be allowed to interfere with our providing them. To neglect any one of them in our defense is to invite disaster. The educational world has definite responsibilities in each of them, and the colleges and universities must and will do their part.

In the first of these—materials—the primary problem is to provide the maximum amount of necessary commodities in a minimum time and with a minimum of wastage.

In the second—men—the problem is to produce as efficiently and as rapidly large numbers of trained men in all branches of the armed service.

In the field of morale, the object of the country is to meet the emergency, present and future, with intelligence and force.

In all these fields, education bears a primary responsibility.

It is true that college and university classrooms cannot be looked to for the providing of basic physical materials. They cannot turn out tanks, airplanes, munitions, food, chemicals, drugs, raw materials or finished products. This is the duty of the mines, the farms, the mills, factories and shipyards. But without the research fostered by the educational institutions, there could be little progress in their field. There is an increasing need for engineers, trained inspectors and supervisors, mathematicians, chemists, office and factory executives. There can never be too many college trained men in the demand of the defense program.

In the second great field of defense, men, the colleges and universities must and will furnish their quota. From the

ROTC and the faculties are coming many men qualified to train and to lead. The draft is taking many youth of 21 or over from the classrooms and laboratories into the armed forces. But whether they are taken immediately or are deferred to complete their college course, it is well to remember that the educated man, who will be the true soldier of civilization after the war, will be valuable to his country for his knowledge of something more than the training received in a military camp.

Fundamental to all else is the great responsibility education bears for the establishing of all the people in proper morale. The college laboratory's contribution in materials is small, though important. The contribution of men furnished from the faculties will not cripple teaching. The present draft will take probably no more than ten or fifteen percent of undergraduate men. The real one hundred percent job is the job of morale education, the preparation, physical, psychological, mental and spiritual, of the men who enter active service, of the home folks, women and children, and the youth not yet ready to be called.

In morale education we must never lose sight of the powerful effect of a unified ideal, permeating the entire people. It is strongest and most effective if it has been inculcated in youth. Possibly our children, who are today hearing and reading each day of the sad state of the conquered nations, will have a deeper conception of the real meaning of what we call Americanism than we older ones have, whose lives have been largely spent in a generation which brought us promises of greater liberties rather than the threat of the loss of those privileges. Certain it is, that the youth of Germany, Italy, and Russia have been heavily indoctrinated with the totalitarian ideals since their birth, and the result is to be seen in the unity of their stand behind their leaders. The longer such dictators stand, the harder they will be to push down, as the rising army of youth trained by them grow yearly larger.

Indoctrination is easy in a totalitarian state. It is slower to be achieved in a democracy, for democracy works locally and in the individual, not in the mass and by decree.

We must, therefore, have education in the American ideal, unending and uninterrupted. It must be practical and realistic, facing the problems of today as they arise, and not an education which is lost in the philosophical speculation of the an-

cients or of the medieval scholastics. It must be the education which is of the whole man—and that man an intelligent citizen in action.

Aside from those in our colleges and universities, the entire public must be educated. They must be led, not driven. They must be enlightened as to facts, and as to what those facts mean. They must be educated as to ideals, and to the eternal need for the highest training possible to keep up the expert personnel which must lead not only the armies, but also the home communities and the state.

Nor must we overlook the spiritual morale. There needs to be a fervor and a religious devotion for the American way. But with that fervor must be joined a calmness of judgement. Otherwise, we fall into the same error of persecution and hysteria which has already blackened the record of some European countries.

It is a usual thing to indict America with the tendency to excess in any views widely held. There is evidence of America's having run after fads in opinion as in fashion. There have been lacks of restraint in important episodes in our history. The "lost generation" of American youth are so called because of the flood of cynicism, materialism, and unworthy ideals which swept the land in the immediate post-war years. A powerful and unified ideal, soundly based, widely spread and sanely restrained, will be a great bulwark of morale for our people in time of stress.

America's greatest defense for democracy "behind the lines" lies in this spiritual unity and solidarity of the people, secured principally through the civil and religious leadership of the educated portion of the nation.

The colleges will do all they can in the technical and the material fields, in providing for defense. The non-technical but vitally important intellectual and spiritual agencies must be protected. This the educational forces of the country can and will labor to effect.

The contribution of the special professional trainings will of necessity be a large one. The schools must increase their output, and must be permitted an adequate supply of young men with which to carry on. We are told that there are only enough doctors now being graduated to fill the normal need. More must be forthcoming. Only enough engineers are being trained to maintain the profession at a peace-time level. The

production of men must be stepped up or the increased production of materials will be in vain.

Figures are quoted which show that the 68 schools of pharmacy in the country, of which 58 are accredited, are now graduating 1,700 annually, though 3,000 annual replacements are now needed in the ranks of 100,000 registered pharmacists of the country's 60,000 registered pharmacies. In this one profession alone, the first call of national defense is for an increase of man power in the profession, not only to fill the military needs but to provide for the protection of the whole population and to guarantee the necessary professional service in all American communities after the present emergency has passed.

Professionalist or non-professionalist, soldier or civilian, man, woman, child—there is no individual in America today who is freed from the demands of total defense. Material, professional, or spiritual aid is required of all.

We are not content merely to speak of the development of leaders for this war. Educators are thinking in terms of something beyond that. New kinds of leaders must be developed to care for the problems of civilization after this war. These must have disciplined capacities, freedom of mind, and daring to experiment. "The future", said Glenn Frank to a student group, "will be closed to the retailer of stale formulas, to the reactionary who forgets nothing and learns nothing; to the radical who sells himself into slavery to some single-track dogma. The future is capturable and controllable by men who will bring to their processes minds that are free, disciplined, and realistic."

Preparation for war must necessarily be hurried. There is a possible wastage of cost and of material. Yet war itself is even more wasteful, especially of men. Billions of dollars and the lives of millions of men go into the prosecution of any war, and the more "modern" the war, the greater the investment.

Preparation for the post-war world must not be carelessly let go, or badly planned. The victorious nations neglected post-war planning after 1918. America did not plan safely. France did not plan safely. England was slow and clumsy. Hitler was decisive and thorough. The difference is to be seen today. There is a lesson to be learned from it as we again

face the necessity of rebuilding another post-war world. There must be here no wastage of human abilities and ideals.

We have an American ideal of a peaceful and democratic world following the subsidence of the present turmoil. Democracy falters in war-time, when speed and directness of action are demanded. Under stress we surrender voluntarily some of the cherished privileges which must be suspended until the struggle has been resolved. But even in stressful times, solid foundations can be laid for the future, for the post-war world, when we return to the fundamental democratic functions.

There can be no democracy without peace; there can be no true and lasting peace without justice; there can be no justice without clear thinking, trained historical perspective, and the active controlled intelligence.

This is the function of education, beyond what we may do in a small way to furnish materials and men. This is the problem of morale education, the backbone of any successful campaign against unenlightenment, bigotry, tyranny, hatred, racial exploitation, and all the horrid concomitants of degenerate totalitarianism.

Above all, we must hold our purpose firm and our course true. If the education America has been giving her young men and women in recent decades, when the world, mechanically developing, was still in a socially static state, has been worth what we think it has, then the mastery of that static world will give young America mastery over the rapidly changing one into which we have been, by force, projected. The lodestars remain true—industry, honesty, tolerance, freedom of opinion. Upon these America's eyes remain fixed.

There are storms about us and storms ahead of us. If we can keep our balance, we will come to safe harbor.

This has best been expressed by the great English poet Robert Bridges, with whose words I conclude. In "The Testament of Beauty" he says: "We sail a changeful sea through halcyon days and storm, and when our ship laboreth, our steadfast purpose trembles like a compass in a binnacle. Our stability is but balance and wisdom lies in the masterful administration of the unforeseen".

The future is indeed, unforeseen; but America knows its course, knows its lodestars, and will administer masterfully whatever comes.

Pharmaceutical Education from the Historical Point of View*

GEORGE URDANG

Director, American Institute of the History of Pharmacy

Pharmacy as the art of recognizing, collecting and selecting medicinal drugs and preparing compounded medicines is as old if not even older than medicine, which is the art of diagnosing disease and systematically employing means for its mitigation and cure. Pharmacy as a profession in its present form is still comparatively young. It was born on European soil in 1240 when the Emperor Frederick II of Hohenstaufen in an edict regulating the hygienic conditions in the kingdom of the two Sicilies separated pharmacy from medicine and made it an independent profession.

As far as we know or may conclude from the general circumstances of the period concerned, the creation of an independent profession, "*Pharmacy*", was primarily due to three reasons: 1. in order to avoid a selfish interest of the physician in the dispensing of drugs as becomes evident from the prohibition of business relations between physicians and pharmacists; 2. in order to achieve a medicinal service of controllable reliability as becomes evident from the introduction of an official supervision of the practice of the new profession; 3. in order to develop and to secure professional skill and responsibility in the preparation of the manifold compounded remedies which just at this period under the influence of Arabic polypharmacy became dominant in European therapy.

It was a new profession of technicians not of scientists that was intended to be and was created by the edict of 1240. What was called science at that time remained with the physicians and it was but little more than the knowledge of some mutilated remnants of antique wisdom and its employment within the definite boundaries of a rigid medical and therapeutical doctrine.

It is but natural that under such circumstances, prevailing until the late 17th and to some extent even the late 18th century, the universities taught *materia medica* in the gen-

*Read in the Session on Education at the Centennial Celebration of the School of Pharmacy of the University of Maryland, June 5, 1941, at Baltimore.

eral frame of the "system" concerned and primarily for physicians. In fact, the pharmacists who attended European universities from the 15th to the 18th centuries studied medicine. Only some French universities, especially Montpellier, offered academic courses for pharmacists as early as in the late 16th century. However, even there, it was pharmacy as a part of dogmatic medicine, not as an art of its own that was taught.

There were during this period, in all European countries, especially in France and Germany, many pharmacists who had gained medical degrees and a considerable number of them continued to practice pharmacy. It is well known that similar conditions prevailed in the United States until about the second third of the 19th century. In England, finally, the great majority of the apothecaries developed between the end of the 17th and the early 19th century into medical practitioners who attempted to retain pharmacy as a source of income but deserted it as a source of professional ambition and as a task.

Thus it was no wonder that until the end of the 17th century and in many countries even later pharmacists could not, as Berendes put it, rise above the technically skilled.

It was the apprentice system that dominated the scene and it represented the only education given to the pharmacists of this period with the exception of the small number who lived in one of the few places, especially in France, where special courses for pharmaceutical apprentices were organized. The young candidate had to serve an apprenticeship of approximately six years. The charter of the English Society of Apothecaries of December 6, 1617, asked even for an apprenticeship of "seven years at the least". Education and examination were until the early 19th century regulated and executed best in France and Germany and worst in England. The examinations were held in Germany by medical officials, while in France and in England they were left to the pharmaceutical associations.

It was in Paris that for the first time, as early as 1471, the candidates for mastership in pharmacy, i.e. for the permission of conducting a pharmacy of their own, had to perform "masterpieces" consisting of the preparation of a series of galenicals requiring special skill and later on of pharmaceutical chemicals. This requirement became general

within most European countries up to the 18th century. It characterizes the particular function which the pharmacist in this period was primarily expected to perform: That of a manufacturer.

There was for a long time in the entire western world only one educational prerequisite for entrance into pharmacy: A satisfactory knowledge of Latin. A German decree of 1573 states that pharmacy clerks should not be "idiots", and must be sufficiently learned not only to know the Latin words but to understand every physician's intention expressed in a prescription.

It has been pointed out that the practice in the store was for centuries the only education given to the average pharmacist. True he had at his disposal some literature and was sometimes even instructed by his master in the reading and understanding of it. This literature consisted, however, mostly of the official and unofficial pharmacopoeias and dispensatories written with only a few exceptions by physicians. Seldom did the pharmacist get more out of these books than the formulas which he had to follow in the preparation of the compounded medicines concerned. In this connection it is significant that in 1724 the English apothecaries in defending their claim to practice medicine even dared the assumption "that an academic education is no wise necessary to qualify a man for the practice of physic".

Although in France an apothecary, Michel Dusseau, presented his colleagues as early as 1561 with a pharmaceutical textbook, the "*Enchiridion ou Manipul des Miropoles*", it was not before the 18th century that real pharmaceutical texts written by pharmacists for pharmacists became common. In the second half of the 18th century one after the other appeared in French and German and, around 1800, there was an abundance of French and German pharmaceutical texts on the market. In England and in the United States, there was no real pharmaceutical text before 1849. The books which the Anglo-Saxon world then got were enlarged translations of the German pharmacist K. Fr. Mohr's "*Lehrbuch der pharmaceutischen Technik*", published in 1847 and adapted by Redwood to English conditions and by William Procter Jr., to American needs.

It may well be said that, when between 1750 and 1850

scientific schooling of the average pharmacist became general all over the world, the textbook was its primary means. Could it remain this way definitely? Experience has taught that it could not.

Scientific chemistry, i.e., chemistry based on and developing theoretical concepts allowing systematic research, began its victorious march. It was widely promoted if not even led by pharmacists and it was pharmaceutical chemistry with which this march started. Books, static as they are by their very nature, could not sufficiently meet the need of vivid and progressive information in such a vivid and progressive science. Furthermore they gave at best a description and not the evidence of the definite essence of chemical instruction, i.e., the experiment. It was on the initiative of the apothecary Casper Neumann who belonged to the prominent promoters of early scientific chemistry, that academic courses were made obligatory for the first time for pharmacists of an entire country. In 1725 all Prussian pharmacists who wanted to practice their profession in one of the larger towns of the Kingdom, the so-called pharmacists of the first class, were required to attend a course of the Superior Collegium Medicum in Berlin. This course was primarily devoted to chemistry, providing lectures in chemistry, discourses on the chemicals used as remedies, their preparation and the chemical-physical reasons for the several kinds of preparation, and finally a "processus pharmaceutico-chymicus", i.e., practical pharmaceutico-chemical instruction. When, in 1803, academic courses became a general requirement for pharmacists in the whole of France, as in Prussia, for pharmacists of the first class, it was likewise chemistry which stood in the center of instruction and examination. There were provided two theoretical examinations, the one devoted to the principles of the art including theoretical chemistry, and the other devoted to the simple drugs and their natural history. However the main part of the examination, four days, was devoted to practical work especially in pharmaceutical chemistry whereby at least nine chemical or pharmaceutical operations were to be performed and explained.

In the beginning of the 19th century the pharmacist had finally developed from an empiric technician to a scientific one. Now as before, however, the needs to be met by him

called for the pharmacist-manufacturer, and his education had to take care of this fact.

The picture changed quickly. Pharmaceutical industry came into existence. The development in Prussia is so typical of the ensuing change of conditions that it may serve as an example. Until 1827 the Prussian pharmacists were legally obligated to prepare all the preparations for the manufacture of which the Prussian Pharmacopoeia contained formulas. In that year appeared a new (4th) edition of the Pharmacopoeia Borussica, allowing for the first time the purchase of such preparations "which are offered by chemical plants and cannot be prepared by the pharmacist without some danger or inconvenience".

It is, however, expressly stated that the pharmacist remained responsible for the identity and quality of the preparations bought by him, and the edict concerned imposed upon him the legal duty to examine these products.

The pharmacist-manufacturer developed into the pharmacist-analyst and again his education took care of this fact.

Already in 1825 a new regulation of the pharmaceutical examination in Prussia gave much place to the chemical analysis. The candidate was expected to write about two pharmaceutical topics, "especially of a chemical analytical nature",† to "chemically separate a natural compound or an artificial mixture",† to execute a "toxicological analysis",† and to name the tests and the way of examination, the adulterations etc. for several chemical preparations.

It was at about the same time that the purely descriptive materia medica split definitely in two different branches: pharmacology as a medical specialty and pharmacognosy as a pharmaceutical one, both of them developing to the rank of specialized sciences. With the science of pharmacognosy the analysis of drugs by means of the microscope was gradually added to the analysis of chemicals.

In the course of the 19th century pharmaceutical education in all parts of the world, without abolishing training in manufacturing pharmacy, tried to make the students as good analysts as possible not only as to chemicals but also as to botanical drugs.

†The passages between the quotation marks represent a translation of the German text.

Again the picture changes. Drugs came into existence which could not be examined chemically but only biologically. Even if chemical tests could be applied, they took so much time and very often required so much of the substance to be tested that the pharmacist could scarcely be expected to execute them. The knowledge of the best methods for the preservation of drugs, of their chemical, physical or biological nature and therapeutic value, of their specific and unspecific qualities became at least as important to the pharmacist and, therefore, to his education and to his educators as his knowledge as an analyst.

Naturally, to a certain extent the pharmacist will always remain a manufacturer as well as an analyst, and the filling of prescriptions on the basis of scientific knowledge and technical skill will never lose its prominent place in the activities of the pharmacist. But is not the filling of prescriptions, representing the actual utilizing of the drugs preserved for this purpose, only the last step in the process of the scientific administration of drugs which has become one of the most important tasks of the modern pharmacist?

The curve drawn in this survey has closed itself to a rounded circle. The retail pharmacist who started as an empiric manufacturer, then developed to a scientific one, and finally to an analyst, has now found his probable definite place: *that of the scientific administrator of drugs before and on the occasion of their dispensation to the public.*

It is unnecessary to explain in detail the importance of this function in our time of rapid scientific development and mass production of remedies of all kinds or to outline the scope of knowledge which it requires. *The scientific administrator of drugs has to know all important data about them and has to be able to convey his knowledge to the physician and, with some tact and reserve, to the public. He has to be an all around man in the sciences concerned and his educators have to enable him to become one.*

It can be said that the American colleges of pharmacy have understood and answered the challenge of this development even better and more profoundly than most of the European pharmaceutical institutions of learning. There in many cases the traditional curriculum of twenty years ago has been retained or only slightly changed. Here since about the same time the educational program has been in the stage of in-

cessant change and reconstruction following whatever necessity arose.

No less a person than Dean A. G. DuMez, our revered host, has given an excellent survey of the "Development of Pharmaceutical Education in the United States" in a paper presented before the Baltimore Branch of the A.Ph.A. on February 18, 1932, and published in the same year in the Journal of the A.Ph.A.

The School of Pharmacy of the University of Maryland furnishes an excellent example of the adaptation of the educational program to the changing conditions of the times that have taken place since its founding. The catalogues of the school furnish the historical material as Dean DuMez rightly states, "admirably suited to this purpose." Not only that this school went through all the typical phases of the development of the American schools of pharmacy, starting as an independent institution, becoming a part of a privately incorporated university and finally of a state university, there were always men active in this school who felt their responsibility toward pharmacy and did something to meet it.

It was from the Maryland College of Pharmacy that the two calls were issued which led to the organized co-operation of the American colleges of pharmacy, i.e., the establishment of the "Conference of Colleges of Pharmacy" existing from 1870 to 1882 and its revival in 1900 under the name "American Conference of Pharmaceutical Faculties". In 1925 the name was changed to "American Association of Colleges of Pharmacy". The time given to me makes it impossible to more than point to the important role this association in co-operation with the mother of all professional American pharmaceutical life, the American Pharmaceutical Association, and the National Association of Boards of Pharmacy, has played in promoting the development of American pharmaceutical education and in giving it the right direction and aims.

It may be stated that there is scarcely another country in the world which possesses such a thorough, official and impartial study of the educational situation in which its pharmacy finds itself, of the professional aims and the educational means to meet them as that placed at the disposal of the pharmacists of the United States in the excellent "Basic Material for a Pharmaceutical Curriculum".

As the following quotation shows, the main principles of

this "Basic Material" are completely identical with the conclusions to be derived from the development which I tried to make obvious in the preceding discourse. In explaining their methods of work the authors of the "Basic Material" state that they sought "to determine with care and exactness the profession and by objective methods to derive with accuracy and definiteness of detail the facts and principles necessary for the mastery of these duties."

This statement means the establishment of continuous progress as a matter of principle, and it has been realized ever since the appearance of the "Basic Material" in 1927.

The progress made in the field of American pharmaceutical education in such an amazingly short time has excited admiration all over the world. It has become history, and I am sure that it will make history in giving this wonderful country the type of pharmacy which it needs and which it deserves.

Literature

- Kremers-Urdang, *History of Pharmacy*, Philadelphia 1940
 Adlung-Urdang, *Grundriss der Geschichte der Deutschen Pharmazie*.
 Berlin 1935
 M. Bouvet, *Histoire de la Pharmacie en France*, Paris 1937
 A. G. DuMez, *Development of Pharmaceutical Education in the
 United States and Its Present Trend*, J.A.Ph.A. 21: 489, 1932

Business Analysis in the Pharmacy Curriculum*

GEORGE H. SEFEROVICH

School of Pharmacy, Loyola University, New Orleans

At our institution we have always considered our graduates in pharmacy in their dual personality, as being at once both professional and business people. This concept has continually influenced our curriculum making, wherein we strive to intersperse the pharmacy training with a few sound courses in economics. But the over-crowded curriculum leaves only too little room for highly specialized courses in drug store operation and management.

However, I believe it is a recognized fact that the independent pharmacist without a knowledge of sound management

*Read before the Conference of Teachers of Pharmaceutical Economics at the 1941 meeting at Detroit.

principles finds difficulty in making profitable the practice of his profession. Therefore, at some point in his college preparation, the pharmacy student should be introduced to sources of drug store operating statistics and to elementary business analysis methods. While it is a debatable point just where this business analysis should be taught I suggest that the salesmanship and accounting courses be used.

Vigorous competition in retail merchandising demands a knowledge of business analysis and management principles. The proprietor pharmacist must know what he is doing as well as what his competitors are doing. He must be able to compare what is, with what ought to be. Therefore, there is a definite necessity for an acquaintance with drug store operating statistics existing in governmental and private publications, as well as a knowledge of comparative analysis.

The student should be made familiar with some elementary but practical statistical devices, such as frequency distributions, averaging, graphing, time series analysis, and correlation. For example, by simply graphing departmental sales and expenses over a period of time on semi-logarithmic paper, departments that are out of line are thrown into bold relief. I have in mind just such an analysis made by the cost accountant of a New Orleans retail drug chain. He compared expenses and sales in a number of different sized units in the chain and discovered that one unit which was growing rapidly was also experiencing a disproportionate rise in expenses. A breakdown of the figures soon revealed the cause. Such simple tools of analysis enable those not particularly skilled with figures to obtain information not immediately apparent from a cursory inspection of the records.

Adequate accounting records, while certainly indispensable, are not completely satisfactory for efficient management. Accounting records are after all merely historical records. The drug store proprietor must understand how to extract from his records information which when properly analyzed will serve as a guide to maximum profits. The assiduous recording of daily expenses and other data is truly important but efficient management requires something more. Good management requires that the operation expenses should be properly allocated and analyzed. Such are but steps in management control. Statistical distributions, averages, and graphs aid in the analysis of expense figures. For example, in at-

tempting allocation and distribution of store expenses among departments many small expenses are lumped and handled as a general total. Frequently, however, small items such as bicycle repairs, linen and laundry, may become excessive if not closely checked and the expenses compared with previous periods or considered comparatively in their relation to total expenses and total sales. Lack of system and analysis creates the occasion for leaks in a supposedly air-tight operation. Simple and manageable graphic controls can be instituted, thus preventing a common source of trouble in a cost system.

I believe that much of elementary statistics is a corollary to accounting. If the accounting course offered to pharmacy students is taught from the management standpoint these statistical devices can be given practical significance. Since the pharmaceutical accounting course should not venture too far into the intricacies of accounting theory, there should be room to deal adequately with the devices mentioned. The course in salesmanship offered to pharmacy students can be given a practical and interesting slant by introducing the student to standard sources of drug store operating statistics such as: The Census of Distribution, Retail Credit Surveys of The Department of Commerce, The St. Louis Drug Store Surveys, The Case Studies of the National Association of Retail Drug-gists, The Lilly Digest and the National Cash Register Studies. Since these sources contain a wealth of information in the student's own field they inject self interest into business analysis.

After having become familiar with the rudiments of comparative analysis and with source material the student is prepared to work intelligently on case problems such as those provided by the Harvard Business School. The instruction in the salesmanship course can be vitalized by the injection of store management problems which require the student to consult the sources with which he has become familiar.

In his pharmaceutical training the student learns by doing. Similar methods should be applied to his business training in order that the technique of efficient management may become standard stock in his store house of knowledge.

Sister Etheldreda, of St. John's College of Brooklyn was the winner of the Fairchild Scholarship for 1941.

Compulsory Review of Examinations and Its Effect upon Grades*

JOSEPH H. GOODNESS
Massachusetts College of Pharmacy

To determine whether or not grades would be affected by compulsory (or voluntary) review of examinations, the author made a special study of 353 college students taking 446 examinations. The examinations were of the essay type and required recall, a type that was thoroughly familiar to all students participating.

The plan of the study was to allow students to complete their examinations under the usual system and when it was completed, without leaving their seats, the students were required to signal a proctor who furnished each signalling examinee with a colored pencil and an instruction sheet. The instruction sheet required the student to spend about fifteen minutes in reviewing both the examination questions and answers, and to make all changes or corrections only in colored pencil. By this means it was possible to determine exactly what changes had been made and the effect of the changes upon grades.

Statistics for the entire 446 examinations may be of passing interest. They showed an average of 10.17 minutes spent in review, and an average net gain for the group of 1.27 points. Changes were made in 361 examinations (81 per cent of 446) on 988 questions, or an average of 2.21 questions per examination (on 446 basis). Eighty (80.06) per cent of these 988 changes created no gain or loss in grades.

On the basis of 361 examinations (number in which changes were made) the 988 changes created an average of 2.73 changes per examination, of which 791 changes (80 per cent) created no change in grades, while 197 changes (20 per cent 19.93 of all changes or .54 changed questions per examination) did affect grades. The 197 grade-affecting changes were made in 151 examinations: 142 of which (94 per cent of 151) gained, while 9 (5.96 per cent of 151) lost. The net gain for the 151 group was 3.76 points per examination.

*Read before the Conference of Teachers of Pharmaceutical Economics at the 1941 meeting at Detroit.

Of the 142 examinations gaining by changes, 95 had passing grades before the gains were added and 47 had grades below 75 per cent. The average gain of the "passing" examinations was 3.57 points and of the "failing" examinations, 5.46 points. The average gain for all those (142) gaining was 4.2 points, the largest gain 23 points, the median gain 3 points, and the modal gain 2 points.

Of the 9 examinations which lost by changes, 4 had passing grades before losses were subtracted (no student happened to fail the examination by these losses) and 5 had failing grades before losses. The average loss for all those (9) losing was 3.2 points, the largest loss 12 points, the median loss 2 points, and the modal loss 1 point.

While these figures may be of academic interest (and perhaps lead to the conclusion that the effort of the students was not worth while) it must be remembered that an examination is a personal undertaking for each student, and individual grades are more important than summary grades for whole classes or groups.

When viewed from this angle, the practice of reviewing examination questions and written work may be considered a good practice, for of the 446 examinees, 16 or 3.58 per cent of all examinees were able to raise their examination grades from below the passing grade of 75 to 75 or over. In the most radical change the increase of 23 points raised the examinee from a grade of 65 to 88. In addition, 4 students increased their grades from below 74 to 74, a grade at which it is the practice of the author to report a "passing 75". If this were the universal practice, 20 students or 4.48 per cent of all those taking the examinations would have obtained passing grades by virtue of review changes.

In addition to the statistics, a detailed study of the papers revealed the following points of interest. Most changes were on points of grammar and created no grade changes since the subject matter was not altered. In two cases the changes first created a gain and then an equal loss. In two cases, although many more existed, students commented that they had already reviewed their examination before the compulsory review was requested and therefore made no changes, although obvious opportunities existed in both cases. One student, after underlining his written work, "doodled" on the back of an examination for the remaining part of the re-

Compulsory Review of Examinations, Its Effect on Grades 65

quested period. His comment was that he thought the experiment "a bit crazy". Freshmen spent the greatest average time in the review (11.12 minutes). The sophomores came next, and then the juniors. The seniors spent the least time, 4.58 minutes on an average. Upper classmen seemed more accurate, since juniors and seniors made fewer changes on the average, than freshmen and sophomores, although class averages were about the same, and more juniors and seniors proportionately made no changes than did freshmen and sophomores. The changes were often due to correction of misinterpreted unambiguous questions or the discovery of omitted parts of questions.

If any conclusions can be made on the basis of the study they would seem to be that students do not spend time, or enough time in the review of *both* the questions and the answers of examinations (and presumably, written quizzes) and that perhaps some resent the time for review; that 20 percent of the changes made during a review will affect the examination grades of 2 out of 5 students making changes; and that the chances are 15 to 1 that the change in grade will be a gain rather than a loss. For those students who are failing before the review, the chances are 1 in 20 that if changes are made during review they will raise the examination grade from below passing to one above. It would also appear that if students—especially pharmacy students—are to be encouraged toward more careful work in examinations and elsewhere, instructors should bring these or similar findings to their attention, since it is only students who may question the existence of benefits that can flow from careful checking.

A PHARMACY CENSUS

The National Association of Retail Druggists is conducting a voluntary census of the pharmacists of the country so as to be able to furnish complete information as to the training and special qualifications of pharmacists to serve the military and civilian defense needs. Other professional health groups have already done this and pharmacists should do it at once so that the information will be available immediately in the case of any emergency. The census will include practicing pharmacists, teachers, research workers, manufacturers, executives, wholesalers, employee pharmacists, pharmacists engaged in other activities, and pharmacy students.

How Efficient is Secondary School Training in Arithmetic?*

LLOYD L. BOUGHTON

School of Pharmacy, University of Kansas

II Additional Data

A year ago I presented a paper dealing with some of the results obtained by giving a set of ten simple arithmetic problems to 300 pharmacy freshmen over a period of thirteen years.† During the last two years I have given the same quiz to my materia medica class of sophomore medical students totaling 166 in all. The test has been given in exactly the same manner as to the pharmacy students, and, since the comparisons favor the pharmacy students so completely, I am happy to present them here. The set of questions was given in the original paper.

In order to get a better picture of the comparison, it is necessary to consider briefly the difference in preparation between the two groups. As was stated in the earlier paper, the pharmacy freshmen had had one semester of college work, including algebra and introductory pharmacy. The tables of weight and measure were studied in the latter course.

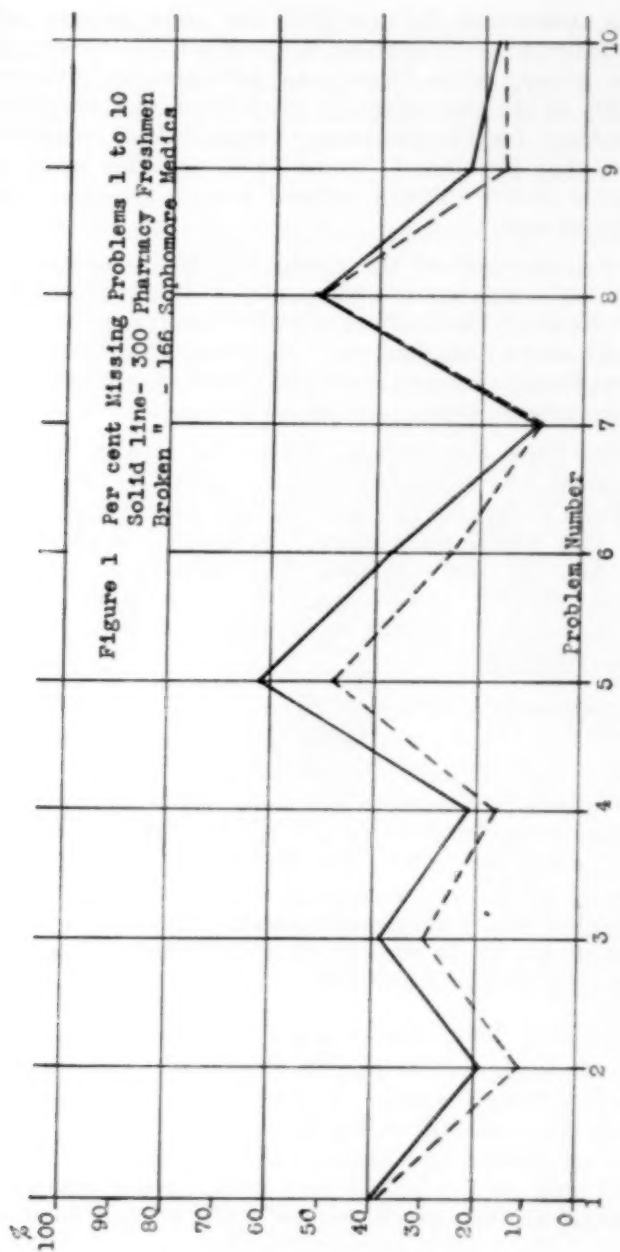
The sophomore medical students had had at least three years of premedical training including algebra, trigonometry, and eight hours of physics. Many of them had received an undergraduate degree or could qualify for one. The important point is, however, that those unqualified for medicine had been presumably ruled out by very difficult premedic and freshman medical schedules, the latter including gross anatomy, microscopic anatomy, bacteriology, and physiology.

In Figure 1, the broken line shows the per cent of 166 medical sophomores failing to work problems 1 to 10. The solid line presents the same material for 300 pharmacy freshmen. Both curves are observed to have the same general contour, and the difficulty sequence differs only slightly for the two groups. The pharmacy freshmen found problem 5 most difficult while the sophomore medics found problem 8 most difficult. Both groups found problem 7 least difficult.

*Read before the Conference of Teachers of Pharmaceutical Economics at the 1941 meeting at Detroit.

†Boughton, L. L. *Am. Jour. Pharmaceut. Educ.* 5:178-186, 1941.

How Efficient is Secondary School Training in Arithmetic? 67



It is interesting to note that the same percent of both groups failed to work problem 8, the most difficult one for the medical group, while there was considerable difference in the ability of the two groups to work problem 5, the most difficult problem for the pharmacy group. Also noteworthy is the fact that problem 1, which involves little more than a reasonable ability to read, offered almost the same difficulty for both groups.

Twelve per cent of the medical students received 100 on the quiz as compared to 11.8 per cent of the pharmacy students. None of the medical students received 0 as compared to 1.5 per cent of the pharmacy students. Thirty-six per cent of the pharmacy students received 60 or less while 27 per cent of the medical students received 60 or less.

While these comparisons favor the medical students to some extent, the difference is not as great as one should expect if the difference in maturity and preparation is considered. This additional material for medical students further emphasizes the fact that precollege training in arithmetic is far from efficient. It also seems to prove rather conclusively that four years of college work does very little to make up for the deficiency.

Arithmetic Quiz Grade Versus Final Course Grade Distribution

These comparisons are presented in Table 1. The final course grades are seen to progress rather regularly from a high percentage of F's and D's for the lower quiz grades to a high percentage of C's, B's, and finally A's for the higher quiz grades. All course grades, i.e., from F to A, are not represented in any single quiz grade. There are no F's above 50 and no A's below 60. D's are significant by their absence only in quiz grades 0 and 100.

Psychological Test Grades Versus Arithmetic Quiz Grades

All freshmen entering the university are required to take a psychological test. It is a general test designed to determine the students' ability to carry university work. The papers are graded on a basis of ability from 10, which is considered poor, to 1, which is very good. Some comparisons of psychological test grade versus arithmetic quiz grade are given in Table 2 for pharmacy freshmen.

The per cent of students failing to make a C average was figured on a basis of all students taking the quiz during the thirteen-year period. Many of them withdrew for reasons other than scholastic, but the average for these was figured at the time of withdrawal. A C average, corresponding to a grade point average of 1.0, is one of the university requirements for graduation.

Results obtained from the two tests compare rather favorably. The arithmetic test, however, seems to be a better indication of ability to carry pharmacy work than the psychological test. This is further evidenced by the fact that 57 per cent of those receiving above six in the psychological test failed to make a C average, while 77 per cent of those receiving below 60 in the arithmetic quiz failed to make a similar average.

Of most importance is the fact that, of those receiving above 6 in the psychological test together with a grade of below 60 in the arithmetic test, 86 failed to make a C average.

The author realizes that tests of this nature are much like the weather—lots of talk about the subject with little ever done. The psychological test alone is a fair indication of ability to carry university work. The two tests when considered together give practically conclusive evidence of a lack of necessary ability. It is not possible, at present and probably not desirable, to deny admission on the basis of such tests. It is, however, possible to regulate the amount of work to be attempted by those shown by the tests to be lacking in ability, or, perhaps better, to require the assistance of competent tutors. The latter is a much neglected, gilt-edged investment.

TABLE 1
Arithmetic Quiz Grade vs. Course Grade
300 Pharmacy Freshmen

| Quiz Grade | % of Total | Final Course Grade Distribution | | | | |
|------------|------------|---------------------------------|-----|-----|-----|-----|
| | | F | D | C | B | A |
| 0 | 1.5 | 100% | | | | |
| 10 | 2.0 | 20% | 80% | | | |
| 20 | 4.5 | 64% | 27% | 9% | | |
| 30 | 3.0 | 14% | 42% | 29% | | |
| 40 | 5.0 | 23% | 40% | 30% | 7% | |
| 50 | 7.0 | 18% | 12% | 60% | 10% | |
| 60 | 15.0 | | 15% | 60% | 15% | 10% |
| 70 | 12.0 | | 16% | 40% | 23% | 21% |
| 80 | 21.0 | | 6% | 24% | 50% | 20% |
| 90 | 17.0 | | 4% | 17% | 45% | 34% |
| 100 | 12.0 | | | 7% | 17% | 76% |

TABLE 2
Psychological Test vs. Arithmetic Test Grade Comparisons
Pharmacy Freshmen

| Psych. Test Grade | % Failing in Arith. Quiz | % Failing to Make C Av. | Grade in Arith. Quiz | % Failing to Make C Av. |
|-------------------|--------------------------|-------------------------|----------------------|-------------------------|
| 10 | 70 | 80 | 0 | 100 |
| 9 | 40 | 60 | 10 | 75 |
| 8 | 20 | 40 | 20 | 83 |
| 7 | 25 | 32 | 30 | 99 |
| 6 | 30 | 44 | 40 | 62 |
| 5 | 30 | 15 | 50 | 63 |
| 4 | 10 | 10 | 60 | 33 |
| 3 | 0 | 6 | 70 | 27 |
| 2 | 0 | 0 | 80 | 10 |
| 1 | 8 | 15 | 90 | 12 |
| | | | 100 | 4 |

A Proposed Curriculum for the First Year Of A Pharmacy Course*

JOHN F. McCLOSKEY

College of Pharmacy, Loyola University, New Orleans

This paper will present my views concerning the proper pharmaceutical courses which should be taught to the student who enters a pharmacy college and will outline in detail the content of the course which is commonly known as *Theory and Technique of Pharmacy*. No attempt will be made to outline the other pharmacy courses for the first year. In order to properly orient the pharmacy courses in the time allotted for the first year student, we must agree on what other courses should or could be taken with them and still permit sufficient

*This paper was read before the Conference of Teachers of Pharmacy at the 1941 meeting at Detroit. In opening the Conference Chairman Clark T. Eidsmoe emphasized its objectives. He pointed out the need for the exchange of ideas between pharmaceutical educators and the need for the improvement of teaching methods. He contends that, as pharmaceutical educators, it is our duty not only to impart technical information which will render the student an efficient public health servant, but to demonstrate also the qualities of truthfulness, loyalty, honor, and justice which will develop the character of the student. He reminded the Conference that it had adopted the recommendation of Dean W. A. Jarrett in establishing the Committee on Long Range Program and Policy. He recommended that this Committee become a permanent one, with a rotating membership in order to insure continuity.—Editor.

A Proposed Curriculum for First Year of Pharmacy Course 71

time for the student to properly attend to his pharmacy studies.

It has always been my firm conviction that a student who enters a pharmacy college is there because he expects to make pharmacy his major subject. It is likewise my opinion that our principal objective as a college is to make the pharmacy subjects the predominant ones. Therefore, I am frank to say that when we do not create in the mind of the student the idea that the pharmacy courses are the major ones in his schedule, we are not living up to our privileges or rights to be called a pharmacy college. I am also convinced that the first year student feels that he is not really a student of pharmacy if he does not have enough pharmacy courses in the first year. The longer we delay emphasizing the subject of pharmacy, the more difficult it becomes to create enthusiasm, loyalty, and pride for the art of pharmacy. Therefore, may I present very briefly the courses I consider essential for the first year, based on a 32 week scholastic year, actual course time only.

| Didactic | Laboratory | Name of Course | Clock Hours per Week | |
|--------------------------------|------------|----------------------------------|----------------------|------------|
| | | | Class | Laboratory |
| 96 | — | English Composition and Rhetoric | 3 | — |
| 96 | — | College Algebra and Trigonometry | 3 | — |
| 64 | 64 | Pharmaceutical Botany | 2 | 2 |
| 64 | 64 | General Inorganic Chemistry | 2 | 4 |
| 32 | — | Elementary History of Pharmacy | 2-1st sem.— | — |
| 32 | — | Calculations in Pharmacy | 2-2nd sem.— | — |
| 96 | — | Theory of Pharmacy Part I | 3 | — |
| — | 96 | Pharmaceutical Technique | — | 3-4 |
| ? | ? | Military-Gym-Activity | 1? | ? |
| <hr/> | | | <hr/> | |
| 480 | 288 | | 18 | 9-10 |
| Pharmacy subjects, clock hours | | | 384 | |
| Chemistry | | | 192 | |
| Cultural and supportive | | | 192 | |
| | | | <hr/> | |
| | | | 768 | |

In presenting this schedule I realize it may be considered heavy because there are 28 clock hours of class and laboratory work which include 2 science courses, exclusive of the major subject, pharmacy. It may be said that outside preparation requires an additional 48 hours; therefore the total hours may seem excessive if we are to expect good work from the student.

Let us examine this statement. At the most, let us consider 76 hours as the requirement for 6 days work or about $12\frac{1}{2}$ hours per day. An average of $4\frac{1}{2}$ hours per day are spent in class and laboratory; the other 8 hours must be made up by utilizing day and night study hours. Studious application on Sunday will reduce this average. In my opinion this is as it should be. I fear that too much idle time is conducive to habits that are reflected in poor work. I have found that the stiffer the schedule and the more work required, the more apt we are to get better work. I believe you must compel most students to work if you are to get the best from them.

The ideal procedure would be to have chemistry taught in the pharmacy college by those teachers who are well grounded in pharmacy and at the same time specialists in their own field of chemistry, but sometimes this is impossible. We must be content with getting the best course in chemistry we can for our pharmacy students even though more hours are required in the college where chemistry is taught.

There is little need for comment about requiring English, algebra, and trigonometry, because no man can consider himself to be educated in a scientific manner if he lacks training in these fields.

In commenting upon the elementary history of pharmacy, pharmaceutical calculations, and pharmaceutical botany, I repeat that, pharmacy being the major subject, it is essential that the student should get a broad picture of the course, be oriented in the profession, develop an *esprit de corps*, and learn to have a finer appreciation of the subject he is pursuing. This can be accomplished by a good elementary course in pharmaceutical history taught by an enthusiastic and well informed teacher who has the ability to tie up historical data with other known facts. Above all, the course should not be given because it is expected or required, but should be given because of its definite value to the student. There is a well recognized need for proper training in the calculations involved in pharmacy, and if necessary, simple arithmetic involving fractions, ratio, proportion, and percentage should be reviewed until the student is confident of his ability and is capable of proper calculations.

There is no need for comment upon military or physical education courses because they are self-explanatory. The

A Proposed Curriculum for First Year of Pharmacy Course 73

credit and hours allowed for these courses must be governed by prevailing circumstances.

The course known as the theory and technique of pharmacy should, as the name indicates, consist of two parts. The time required for the theory should be 3 hours each week, with 3 semester credit hours. The laboratory course, concerned with the technique of pharmacy, can be separate or a part of the theory. In this course, the student uses for the first time a great deal of the equipment generally required in pharmacy, and his first impressions are important and lasting. Therefore, it should be a *dictum* that only standard equipment of reliable manufacturers should be used. The materials or substances used in experiments should be of standard quality. These should be available in original containers, because the student must at some time use the manufacturer's packages and he should learn to read the labels accurately. The stock clerk should not do the weighing or measuring of substances to be used in experiments. One objective of the course is to teach the student accuracy and cleanliness in weighing and measuring, and these are lost if the student secures only the exact amounts already weighed or measured for him. In the same vein, I would condemn as poor pedagogy the practice of any teacher who places the proper weights on a balance and requires all students to use this balance.

Because these courses are elementary in the teaching of pharmacy, they should be definitely limited in their scope. While I am fully cognizant of the benefits of repetition, I see no reason why we should include experiments which definitely belong to the more advanced classes. Therefore, the course in the theory of pharmacy should be composed of lectures, demonstrations, and visual presentation accompanied by oral and written quizzes and examinations. The scope and content of the course should definitely and specifically cover the historical origin, use, development, and practical application of each subject or process, the present place they now hold in the profession and the reasons why they are necessary or why they have been replaced.

If the history of pharmacy course covers literature, laws, organization, ethics, and philosophies, these topics need not be included in the theory course. The librarian of the college, or another person as well qualified, should be called

upon to discuss the library facilities and the procedure in securing information from the many sources available. These lectures, one or two being sufficient, should be accompanied by actual library demonstrations.

A satisfactory arrangement of the lectures in the theory course is offered here.

GROUP I

Metrology-balances, scales, weights, and measuring instruments.
Specific gravity and specific volume.
Heat-apparatus and fuels; measure and control.

GROUP II

Calcination, ignition, deflagration, incineration, carbonization, torrefaction, fusion, melting point, boiling point, evaporation, exsiccation, granulation, crystallization, sublimation, distillation, sterilization.

GROUP III

Solubility determination
Solution-simple, chemical, saturated, colloidal, percentage.
Solvents.

GROUP IV

Separation of liquids and solids from liquids.
Decantation, siphoning, sedimentation, precipitation, clarification, colation, lotion, decolorization, filtration, osmosis, dialysis, elutriation.

GROUP V

Dessication efflorescence, deliquescence, trituration, levigation, lixiviation, trochiscation.

GROUP VI

Garbling, comminution, contusion.
Drug mills.
Sifting.

GROUP VIII

Extraction, maceration, digestion, infusion, decoction, expression, percolation.

In arranging the theory lectures, consideration must be given to the laboratory work in technique in order that the appropriate experiments can be assigned simultaneously with the appropriate theory lectures.

The theoretical aspects, the scientific principles involved, the practical application and the historical aspects pertaining to all of the above mentioned topics can be covered in sufficient

A Proposed Curriculum for First Year of Pharmacy Course 75

detail to permit quizzes and examinations to be included in the time allotted. This amounts to from 25 to 27 weeks. The remaining weeks should be utilized in presenting the complete lecture work concerning the waters and syrups of the United States Pharmacopoeia and the National Formulary.

Pertaining to the course in technique of pharmacy nothing can be said other than that the laboratory work should cover experiments in sufficient number for each topic or process to permit the student to gain a better knowledge of the subject through application of the principles, and to develop skill and technique in the operations. Since one of the objectives of the pharmacy course is to make the student proficient in preparing medicinals, the experiments in technique should be selected from the United States Pharmacopoeia, the National Formulary, and standard formularies. Special attention should be given to labeling, checking formulae and ingredients, the choice of containers, proficiency in wrapping and tying packages, and to cleanliness.

Each laboratory assignment in technique should be accompanied by a brief outline of what will be expected in the day's work. The handling of equipment, particular points to be observed in the experiments, and the recording of notes should be stressed by the instructor at this time. The person in charge of this course should be a skilled technician. He should have experience in teaching and a broad view of the entire field of pharmacy in order to create the correct attitude and habits in the beginner.

Pertaining to demonstration work in these courses—it has been stated by certain educators that this is largely a remnant of earlier days when text books were not so easily available and when the student did not have time or the ability to cope with the written material on the subject. Regardless of these opinions, I am convinced that specific class room demonstrations are valuable in impressing certain facts upon the mind of the student. A demonstration should be made when it is too costly to have each student perform individually, and when too much time is consumed in performing the experiment. Demonstrations afford the opportunity to present the proper techniques to be followed in laboratory work, and every lecture covering a particular subject or article should be supplemented with as much visual material as possible.

In evaluating the student, we generally use examinations. The question of the frequency and the kind of examination to be employed in testing the student's ability to understand, to retain, and to use the information and education to which he has been exposed during the lectures and laboratory work, is always debatable among those engaged in teaching. A discussion of this subject is beyond the scope of this paper, nevertheless, the following pertinent facts should be considered. "If examinations, quizzes, and tests are to serve their purpose, it is important that we understand what we are trying to do and what the results mean. There should be a source of information for the guidance of students and for the improvement of the instruction. They should discover the difficulties which the students are having, give us an estimate of the effectiveness of our teaching, and indicate how well the student is progressing. Finally, they should be incentives to better study."¹ "The examination should be so constructed that we can learn if our students understand the technical terms used, if certain facts and principles are clear, and if they can apply principles to situations and be able to interpret what has been discussed or demonstrated. They should reveal if the student is acquiring skill in techniques."² With these few facts in mind, I believe that quizzes should be given not less than once a week. The so-called snap quiz taking from 10 to 15 minutes is ideal for certain purposes. A monthly and a semester examination should be obligatory.

Now let us determine the objectives of the courses in theory and in technique. Briefly, the objectives of the course in theory are:

1. To give the student a limited view of the art of pharmacy.
2. To help orient the student in his scientific work and to encourage him in his efforts.
3. To inform the student about the equipment he uses in his work.
4. To present fundamental principles, facts, and information on the simpler operations in pharmacy and to develop them in such a way that they can be applied in the laboratory.
5. To present as much historical data as is possible concerning each of the subjects covered.
6. To train the student in the need for complete understanding of everything which he reads pertaining to pharmacy, and to de-

¹ Achievement Examinations—Hawkes, Lindquist, Mann

² Ibid

A Proposed Curriculum for First Year of Pharmacy Course 77

velop the ability to differentiate between essentials and non-essentials.

7. To acquaint the student with the texts, references, and literature in pharmacy, and to supplement this with library problems.

The objectives in the course of technique are:

1. To train the student in the skillful use of some of the equipment used in pharmacy.
2. To acquire skill, exactness, and cleanliness in procedures.
3. To acquaint the student with the materials used in pharmacy.
4. To apply fundamental principles and facts.
5. To create confidence in the student.
6. To measure the student's ability.

If we can attain these objectives in the courses I have outlined for you, I believe we will have laid the proper foundation upon which to build for the future courses, the completion of which will permit us to graduate men worthy of the tradition of pharmacy.

DISCUSSION

E. L. Cataline, College of Pharmacy, University of Michigan.—The first year should include those courses which provide the best foundation for the courses of subsequent years. Courses in English, composition, rhetoric, oral expression, algebra, trigonometry, and general inorganic chemistry are basic. In spite of the extensive use of synthetics, crude drugs are essential, and botany is a necessary prerequisite for their study. Standard courses in botany, taught by an instructor with a background of pharmaceutical training, are advocated by some as being most desirable. Actual handling of weights and measures in making pharmaceutical calculations is essential for good teaching. History of pharmacy should be stressed as a morale producing agency and perhaps would be more effective if given in the later years.

William J. Husa, University of Florida.—It is debatable whether it is better to give any pharmacy in the first year or confine all work to the study of the basic sciences. This is the policy in some colleges and schools in the Argentine. The weakness in the short courses, formerly given, lay in the fact that the professional courses were based upon an insecure foundation. The student's interest in pharmacy may be developed throughout the year by a series of special lectures on the history, the possibilities in, and the accomplishments of pharmacy and pharmacists. The special fields should be discussed. Care should be taken not to overlap subjects commonly given in chemistry and physics by repeating in pharmacy. The logical place for acquiring knowledge and skill in technique is in courses where pharmaceutical preparations are made. A separate course in technique is hardly necessary.

David W. O'Day, University of Colorado.—The need for placing emphasis upon pharmacy in the first year merits attention, but such emphasis must necessarily be limited because of lack of time. Students do better work on a full schedule when they are crowded for time.

Yet, if they are loaded with more than is humanly possible, they may be led into superficial habits of study which are detrimental. The load should be sufficiently heavy to prevent idling. It is true that some instructors will get more work out of students in a two hour course than others will in a five. First impressions which students get in class room and laboratory are most lasting. Therefore rooms and laboratories should be well equipped, well cared for, well managed, and economically handled; by so doing students will absorb the proper habits. The objective of teaching should be the development of the faculties of the student for scientific observation and inquisition.

A Course in the Chemistry of Organic Medicinal Products.*

WALTER H. HARTUNG

School of Pharmacy, University of Maryland

Last winter I had occasion to discuss a refresher or brush-up course with several graduate pharmacists. Two of the group were representatives of manufacturers or wholesalers and perhaps their views may not be representative of the entire pharmaceutical profession. Nevertheless their ideas were most enlightening. Where I had argued for a strongly scientific content for these courses, they maintained that the modern pharmacist does not need much science; they insisted that the manufacturer supplies all the science that pharmacist needs, and that the retailer can depend on it absolutely; instead, they argued, the refresher course should deal more particularly with economics and salesmanship.

These expressions came as a shock to me. If they contain a fragment of truth, then perhaps the pharmaceutical educator should take cognizance of the situation and revise the entire curriculum accordingly. However, it is not my object to argue this point; rather I shall proceed on the basis that modern pharmacy, though it necessarily includes much of economics and salesmanship, is based on a liberal educational foundation strongly fortified by the sciences.

The statement, by these salesmen, that the pharmacist is a re-salesman, has provoked considerable thought and set me to wondering about the value of my own specialty, chemistry,

*Read before Conference of Teachers of Chemistry at the 1941 Meeting at Detroit.

to pharmacy in general. It is a question, I think, that deserves serious consideration.

To begin with, let me say that personally I have no doubt at all about the value or indispensibility of chemistry to the modern professional pharmacist. Yet it may not be amiss to examine more closely into actual cases in order to determine, if possible, the amount and kind of chemistry best suited for our students. This can be best done, it seems to me, by seeing what becomes of our students.

It has been my pleasure to be a teacher for the past five years. During this time one student each has gone into the following fields: politician, law student, grocer, manufacturer, and the army (this does not include men drafted during the present emergency). Four students are working as chemists in chemical laboratories, some of them quite remote from pharmacy. Six each have gone into the medical school and into the selling of drug store materials. The rest have gone into practicing pharmacy or are taking advanced work in the fields of their choice. What kind and how much chemistry do these various men need and how can we best equip them for their respective duties?

It is quite obvious that we are not going to be too much concerned about the man who enters the legislature, for even as a lobbyist for pharmacy his chemical training is not going to help him one way or the other. Likewise, we are not primarily engaged in graduating grocers, although we hope that a pharmaceutically trained grocer is quite superior. The graduate who is now taking law is preening himself for a career in the various enforcement agencies; the pharmaceutically trained attorney ought to know the fundamentals of chemistry and be familiar with the language of the pharmacist.

The man who is in the army and the manufacturer are in reality pharmacists, and therefore need not be considered separately. After all, we hope that the professionally trained man will take the commissions now offered to pharmacists, and we naturally feel that the pharmaceutical manufacturer should be trained in our schools of pharmacy.

What about the salesmen? I have the impression that the house which employs the prospective representative in the field is primarily interested in his background,—he must know the language and meet people well. If he needs a special

sales talk that has any chemistry in it, he will get it in his firm's "sales school"; he is taught to use this to very good purpose even though he may know little about chemistry or even appreciate the full meaning of what he is saying. Yet, because many of these men who enter the selling field become detailists and in that way keep our physicians informed about newer developments, we ought to give these men the best course and foundation we possibly can.

We next come to the man who has a B.Sc., in Pharmacy and then enters a medical school. He is really a special case. He takes pharmacy as premedical training because he feels it will give him the best foundation for his life's chosen work. This type of man deserves, it seems to me, every possible encouragement, and a thorough course in the chemistry of things medicinal ought to be of great benefit. Some of our graduates who are now enrolled in the medical school have told me that the chemistry with us has been most valuable; in fact, they wonder how some of their classmates, who have taken their premedical training elsewhere can know so little about chemistry and still make successful medical students. This probably accounts in part for the apparent erudition displayed by many physicians often to the bewilderment of the patient; but when one goes back of this he is likely to find the educational fruits of a clever detail man. One is reminded of a quotation from Faust: "Wo ein Begriff fehlt steckt man oft ein Wort hinein." I should like to see the physician more fundamentally and extensively trained in chemistry.

While it is not our primary purpose to train analysts for the steel mills or the metallurgical industries, we certainly should assume the responsibility of training competent men for drug analysis, whether it be for manufacturing control or for the enforcement agencies. Yet are not the basic principles of chemical analysis every where the same? Does one type of analyst build on a different foundation than the other? Is not the difference chiefly one of application? If we are going to train any one for a career in analytical chemistry, then we cannot give this man inferior training, either in amount or quality.

However, most of our students, about 80 per cent of the five classes with which I have been associated, enter the drug store. As I mentioned earlier, I am not here to settle the question whether the function of this newly registered man in

present society is to be primarily a merchandizer, a purveyor of manufactured drugs and prescriptions—and a host of sundry items—or whether he is a specialist and a pharmaceutical scientist. I shall take the position that he is the latter, an assumption which I feel needs no explanation or apologies.

Two years ago, before this conference, I took the position that any chemistry which is given in our schools or colleges of pharmacy deserves to be of the highest quality, on a par with that available to chemistry majors. I have had no reason, since then, to alter this opinion except, if possible, to be more convinced of its soundness. After the foundation is laid, then the edifice may be constructed. The edifice, as I tried to point out at Atlanta, is not completed when the student gets his baccalaureate degree; only the foundation is ready and on it the real pharmacist develops with the passing of the years.

How can we best meet our obligations in giving the pharmaceutical scientist of the future the foundation and capacity in chemistry which he has a right to expect? The answer to this question may be best obtained by first setting up the ideal and then determining just how near that ideal we can come. My ideal would be a minimum of four years, a year at least in each inorganic and qualitative analysis, organic, analytical and physical; on top of these I would recommend one year of an integrated course dealing with the chemistry of medicinal and pharmaceutical substances in particular. Since such a program would require at least five years, and only four are available, some compromise or adjustment is called for. We are, at present omitting physical chemistry from the required list for reasons which I shall explain later. As now set up, our sequence of required courses at Maryland is as follows:

First year: general inorganic chemistry and qualitative analysis.

Second year: general organic chemistry.

Third year: analytical chemistry, the first half dealing with general quantitative principles and procedures, the second half applied to official pharmaceutical methods.

Fourth year: chemistry of medicinal products, with a parallel laboratory course optional.

It will be seen that for the first five semesters the student's chemistry is in the fundamental or basic courses. Only in the sixth semester does he begin what may be called specialization. Even this arrangement is not satisfactory since it does not provide all the opportunity we should like for the study of inorganic medicinal products. However, it is of the fourth year course that I should like to speak in particular.

The objective, during the fourth year, is to integrate so far as possible all the student's chemical information and knowledge with any new material offered. We begin with hydrocarbons, review physical properties, chemical properties, effects of homology, characteristic reactions, *etc.*, of the paraffins, olefins, acetylenes, aromatics, polycyclic compounds, *etc.* Whenever possible, pharmaceutical uses and medicinal applications are mentioned. Next we discuss the methods of preparing the halogen derivatives of the various types of hydrocarbons and review the physical and chemical properties and discuss the physiological effect of the halogenated hydrocarbons. Then comes the hydroxyl group; the preparation, the physical and chemical effects, biological properties, *etc.* Following this comes the combination of halogen and hydroxyl. And thus one may continue in order with each of the functional groups, the carbonyl, the carboxyl, the amino group, the nitro, the sulfur, heterocycles, *etc.* The emphasis is always on the chemical characteristics of medicinal products and an effort is made insofar as present information permits to correlate structure and physical and chemical properties with medicinal uses. We feel that this approach is fully justified because in his pharmacology courses the student finds the drugs classified according to therapeutic properties.

Now as to physical chemistry. With us it is almost exclusively a graduate course and taken only by advanced students. There are several reasons for this. First, physico-chemical principles have not yet assumed the important position in medicinal or pharmaceutical chemistry now held by, say, organic chemistry; since something has to be sacrificed from our ideal we feel that the least loss to the pharmacist is in omitting physical chemistry from the four year curriculum. Second, if taught as it should be, physical chemistry is not an easy subject (and we have constantly maintained if given at all it must be of top-notch quality) and should be taken only by students who have had calculus and physics as a mini-

mum prerequisite. We cannot, in our already crowded curriculum, ask the average student to take on such an additional load. Third, the good student, who continues for an advanced degree, is expected to take physical chemistry early in his graduate course. Thus, the man who will be able to use it best will take the subject anyway.

Now, if you will be patient, I should like to take up the requirements for graduate instruction. First, let us answer this question: Is there a need for post-graduate training in pharmaceutical or medicinal chemistry? Let me say that Smith College and Yale University are offering courses in medicinal chemistry, and I have heard of other institutions contemplating the introduction of similar courses, but not in connection or cooperation with the pharmaceutical departments. There are many men actively working in the field of pharmaceutical chemistry, most of whom have never taken work in a school of pharmacy. Yet, it seems to me, other things being equal, that the student who has taken his undergraduate degree in the atmosphere and surroundings of a progressive and up-to-date school of pharmacy ought to come through with an intangible asset that ought to make him well-nigh indispensable in many places. He should be able to avoid much of the floundering and waste motion which the non-pharmaceutically trained Ph. D. must almost necessarily pass through before he can contribute his best to medicinal chemical research. I feel that here we have a splendid opportunity, in training men for advanced work, and we must make our courses so valuable and in such demand that we have students from the medical schools and the chemistry departments asking for admission.

But let us not deceive ourselves. We cannot turn out second-rate material nor dare we let first-rate material get out of our laboratories with second-rate educational equipment and thereby expect to restore proper dignity to the name of pharmaceutical chemist.

I am prompted to make this observation about the dignity and standing of the pharmaceutical chemist by an experience of one of our graduate students. This man had a profitable term of service at the Mellon Institute and is now successfully employed by a reputable manufacturer. During the spring of the year in which he came up for his Ph. D. degree he attended the semi-annual meeting of the American Chemical

Society and registered as one seeking a position. On his card he placed his major as pharmaceutical chemistry. The man in charge of the employment service asked him about his qualifications and training and then said, "You had better not call yourself a pharmaceutical chemist, because no one will be interested in you; call yourself a biochemist or an organic chemist."

I maintain that when a man gets his Ph. D. degree with pharmaceutical chemistry as a major he should automatically be equipped with:

1. A broad and sound training in all the fundamentals of chemistry, including proper foundation work in physics and mathematics. He must first of all be a chemist.

2. He must have acquired those intangible and unassessable qualities which come only from having lived and worked, from his high school days on, with medicinals and pharmaceuticals so that they are part of him.

To give the student any less than that, we are only fooling ourselves and we are not playing completely fair with our responsibilities and obligations.

To provide the future pharmacist with an understanding and appreciation of the chemistry of the products he dispenses and to give the student who will go on for advanced work a basis for growth and development, are the reasons we are so deeply interested in this chemistry course covering the medicinal products.

Laboratory Work in A Course in the Chemistry of Organic Medicinal Products*

W. TAYLOR SUMERFORD

School of Pharmacy, University of Georgia

Introduction

The fourth edition of *The Pharmaceutical Syllabus*, published in 1932, lists Organic Pharmaceutical Chemistry as an optional subject with forty-eight didactic hours and sixty-four hours for laboratory work. This is hardly in keeping with the importance of this subject. Modern medicine has fortunately got away from eclectic remedies and is demand-

*Read before the Conference of Teachers of Chemistry at the 1941 meeting at Detroit.

ing potent drugs of known composition and dependable action, such as: bacteriostatic dyes, organometallics, alkaloids, vitamins, hormones, synthetic germicides, etc. To provide such drugs as these from natural sources or by synthetic means, to preserve them and to combine them for dispensing, requires nothing less than thorough and intelligent training in the exact science of chemistry.

To provide such training, a well balanced, properly correlated, didactic and laboratory program is necessary. On the presumption that a student will remember something he has done long after he has forgotten something he heard, the laboratory is the place to teach the chemistry of organic medicinal products, or any chemistry for that matter.

Earlier Reports on the Subject

In 1898, Dean Wulling, of the University of Minnesota College of Pharmacy, outlined a laboratory course in organic pharmaceutical chemistry. This course called for the preparation of twenty-six synthetic medicinals and the carrying out of eight laboratory operations, e. g., the determination of a molecular weight, a boiling point, a flash point, etc.

In 1934, Dr. Glenn L. Jenkins,² then at the School of Pharmacy of the University of Maryland, published a paper in which he stated that the laboratory portion of a course in organic pharmaceutical chemistry could be built around experiments having as their objective the isolation of certain active plant principles, with a subsequent study of their identity and purity. The complex synthetics, he further stated, could also be studied from the standpoints of identity and purity.

Except for these two papers, little or nothing has been published on this subject, but papers have appeared in *The American Journal of Pharmaceutical Education* on the teaching of laboratory courses in pharmacy,³ pharmacology⁴ and bacteriology.⁵

The Homologous Series of Organic Compounds

The authors of laboratory manuals in general organic chemistry, as a rule, give priority to experiments involving syntheses, or experiments involving simple reaction in a test tube, or a more or less well balanced combination of these.

A proper approach to the laboratory work in the chemistry of organic medicinal products will draw on all of these viewpoints. This approach makes for a fundamentally sound

course and will prepare our students for the retail drug store or for the pursuit of a graduate program leading to teaching, research or whatever they may choose.

In contrast to the other schemes, for example, a classification based on plant sources, the homologous series of organic compounds, supplemented by certain other groups to be named later, provide a convenient and a useful means of dividing the actual laboratory work. Since the student will already have had two or three years of chemistry, it seems logical to begin the work with hydrocarbons, passing from the simplest to the most complex, reviewing their physical and chemical properties, and where feasible, checking these in the laboratory. In this way he will become more familiar with the properties of unsaturation, cyclization, aromatization, etc. Following this, he will observe the effects on the hydrocarbon when it is substituted by various functional groups such as the halogen, hydroxyl, carboxyl, carbonyl, nitro, amino, etc. This system of classification requires alcohols and phenols—both containing the hydroxyl group—to be studied jointly and at the same time permits them to be differentiated. Compounds containing both a halogen atom and a hydroxyl group are taken up after the halogenated hydrocarbons and alcohols have been covered. Ethers, since they are derivatives of hydroxylated compounds, are studied in connection with alcohols and phenols, and esters are treated as derivatives of acids which, indeed, they are. If these structural relationships are properly stressed, then the competent student will be able to appreciate the possible chemical behavior of a medicinal agent when he sees its structural formula.

In addition to these advantages, this arrangement of the compounds simplifies correlation with the lectures; presents the work for all practical purposes in the way in which it was covered in the preliminary courses in organic chemistry, and of still more importance, provides a means of stressing group reactions which is so necessary in view of the excessive number of organic compounds existing.

It has been found that the laboratory exercises for each series of compounds are profitably preceded by a brief discussion of the general rather than the applied chemistry of the compounds involved. Throughout this discussion it is advantageous to insert 'home work' problems which have been selected with the objective of emphasizing the relationship of

homology to physical and chemical properties, and where possible, to physiological action.

The actual experiments are, generally, limited to compounds of medicinal or pharmaceutical interest. There are usually enough of these in the several series to illustrate all necessary reactions both general and specific, and moreover, the student becomes familiar with the physical properties and chemical actions of the compounds he will encounter in the drug store. Enough experiments on non-medicinals should be included, however, to demonstrate chemical relationships within the series and to provide a foundation for the interpretation of new drugs as they appear.

The laboratory exercises include the syntheses of selected medicinals, suitable for type reactions. Such procedures have a special appeal, provide an opportunity to apply purification methods, determination of melting points and calculation of percentage yields. As a rule, only syntheses capable of being completed in one laboratory period and requiring simple assemblies should be attempted.

Simple reactions or 'test tube experiments', even solubility tests, are necessary in giving laboratory work in the chemistry of organic medicinals. These experiments are generally used to stress chemical and physical relationships within the groups, and are specifically used to point out prescription incompatibilities and remedies therefor. The findings from these tests should be tabulated wherever possible because this trains the student in properly recording scientific phenomena, conveniently and forcefully brings the results of the experiments to his attention and, in addition, promotes neatness.

Groups Other Than the Homologous Series

In a complete laboratory course in the chemistry of organic medicinal products it is necessary to add some experiments on enzymes, glycosides, saponins, tannins, and alkaloids. These do not fit smoothly into the homologous series of organic compounds, nevertheless they show a definite physical and chemical relationship within the groups. These naturally occurring medicinal products are important *per se*, and provide a place for presenting hydrolysis, fermentation, catalysis and other reactions typical of biological processes.

U. S. P. and N. F. Identity and Purity Tests

The identity and purity test of the U. S. P. and N. F. right-

ly have a place in the laboratory work in pharmaceutical chemistry. The character, the uses and the limitations of these official tests have been stressed by incorporating a representative selection with the appropriate laboratory exercises. Among the experiments dealing with the hydroxylated compounds, for instance, the U. S. P. test for detecting thymol in menthol was applied to pure menthol, to thymol, and to a sample of menthol contaminated with thymol.

Spot Tests

Except for a few identity tests for alkaloids and one or two outside volumetric indicators, spot tests have, in the past, been neglected in laboratory courses in general and applied chemistry. Feigel's book on this subject and recent tendencies toward semi-micro analyses have focused attention on this subject. These tests should be adopted and extended by the pharmaceutical chemist since they are ideal for drug work; requiring small samples and lending themselves to wide application in the laboratory and at the prescription counter. In fact, with both black and white spot plates, micro-crucibles and spot test paper now available, the spot test will probably replace many of the qualitative reactions formerly carried out on a larger scale in beakers, test tubes, etc.

Special Subjects

Certain selected laboratory operations not previously met may now be included. Chromatographic adsorption, because of its new found uses, and an experiment in dialysis, due to its biological importance and wide use, are suggested.

Library Problem

As a library problem, the student is asked to consult the original literature and write up the directions, with a cost record, for preparing a drug which requires at least three steps in its synthesis. A complete bibliography in the style used by *Pharmaceutical Abstracts* or *Chemical Abstracts* should be appended. This problem is designed to acquaint the student with the pertinent literature, help him adapt described processes to his own purposes, make him conscious of sources of supply and develop an appreciation of cost.

Conclusion

It is recognized that the amount of laboratory work out-

lined in this paper far exceeds that which can be covered during the amount of time allotted by *The Pharmaceutical Syllabus*. In fact, it may be more than can be got into two semesters. However, it does provide a complete program and permits the individual instructor to select experiments to fit a special or an average situation. It is claimed that if the work is properly executed the course will compare in scope and character to the laboratory work given in other applied chemistry courses.

A realist would hasten to point out that ten times more chemistry has been outlined here than is needed in the modern retail drug store. The only answer to this is: we must teach up to the level on which we would like to see professional pharmacy placed and not on a level below which we will ever be satisfied to see pharmacy eventually find its station.

REFERENCES

1. Wulling, F. J., *Proc. A. Ph. A.*, 46 (1898), 580.
2. Jenkins, G. L., *J. A. Ph. A.*, 23 (1934), 1142.
3. Griffith, Ina, *Am. J. Phar. Ed. I* (1937), 139.
4. Dille, J. M., *Am. J. Phar. Ed., III* (1939), 72.
5. Grubb, Thomas C., *Am. J. Phar. Ed., III* (1939) 237.

Should Separate Courses be Given in Organic Chemistry and Organic Pharmaceutical Chemistry?*

ELDIN V. LYNN

Massachusetts College of Pharmacy

An understanding of organic chemistry is fundamentally necessary in pharmaceutical practice. It would seem that none of us who are directly interested in teaching the subject would doubt the truth of this statement, but a consideration of some figures may emphasize the point in our minds. In 1888, 38.5 per cent of the materials described in the U.S.P. and N.F. were more or less pure compounds, and much less than half of these were organic. A tabulation of the figures after each new revision, and later inclusion of materials in

*Read before the Conference of Teachers of Pharmacognosy and Pharmacology at the 1941 meeting at Detroit.

New and Nonofficial Remedies, shows a steady rise of organic compounds, a slight decrease in inorganic ones, and a considerable falling off in all other drugs. Basing the latest compilation on U.S.P. XI, N. F. VI, and N.N.R. 1940, we find more than 50 per cent of the total are organic compounds, about 20 per cent are inorganic, and somewhat more than a fourth are animal, vegetable, and miscellaneous crudes. Furthermore, the chemistry is well known for a large share of the animal and vegetable materials, so that the intelligent use and handling of about 75 per cent of our drugs entails an adequate knowledge of organic chemistry. Without going into the obvious reasoning, we must realize that this branch of chemistry is the most important course given in the undergraduate curriculum.

The subject we have under discussion, therefore, assumes a particular significance.

First let us thoroughly understand that the method we use, whether or not we have separate courses, is not necessarily of our own choosing. We are only the victims of circumstance. The policy of the school as to who shall teach elementary organic chemistry is the governing factor. In the university with a department of chemistry serving several different colleges, the course in organic chemistry is usually given by a professor who knows nothing about pharmacy or medicine. Under such conditions the faculty in pharmacy has practically no voice in the matter and, naturally wishing to have at least some instruction in pharmaceutical applications, must introduce a second course. On the other hand, even if the elementary instruction is given by one thoroughly conversant with medicinals, he and his colleagues may feel that a divided subject is easier to teach or more advantageous for the student. But, whatever our own convictions in the matter, we may have to make the best of whatever method was handed down to us.

In the minds of those of us who are best acquainted with the fundamental importance of the subject and who are teaching it, there could seem little doubt that two or more courses would be ideal. No matter how intensively a student may apply himself or how extensive the class periods, it is difficult for him to grasp all of the necessary phases of this branch in one year. Indeed, the writer has no hesitation in expressing the opinion that several years of study of organic

chemistry and its applications would much better fit the student for coping later with the problems of professional dispensing practice. Under any circumstances the advantage of an additional study of pharmaceutical applications, after the preliminary attention to technical language, fundamental principles, and essential reactions, would seem obvious.

We must, however, in formulating the four-year curriculum consider also what time must be given to other necessary subjects. If there was plenty of time to give an adequate amount to each of them, then we would not need to be considering our present topic. When we add up the totals for all, each arrived at by experts in particular fields, we find a curricular amount of time equivalent to much more than four years. It is true that the estimates for a given subject may appear very high to those of us who are in different lines, but we must remember that our own figures also appear extravagant to others. The Syllabus Committee, presented with the task of coordinating all estimates and fitting them into four years of the undergraduate curriculum, has a delicate problem. Naturally each one of the twenty-one members is more or less of an expert in some particular field or at least more informed on one branch and must be somewhat biased, even if only subconsciously. All of them, I believe, have sincerely tried to be fair, and the Committee has finally arrived at what is presumably a correct division. To an individual teacher, looking at the matter from one viewpoint only, the result may appear discriminating, but the writer is of the opinion that the minimum evaluation as given is essentially equitable.

In studying the time allotment that has been made, two factors must be kept in mind, although we may not agree with the action taken in regard to them. In the first place, when the decision was made to change from three to four years, the most cogent argument in favor was that time must be allowed for a broadening of education; indeed, many maintain that this was the only excuse for bringing about the change. Therefore, division of time among the various subjects has been made on the basis of three years, leaving one year for attention to the so-called "cultural" courses. Secondly, the figures given are minimum only, and the faculty of an individual school has some latitude in adding to the time, providing the total extra professional work does not exceed a

certain limit. In any event provision has been made for at least some work that is not directly related to pharmacy.

Keeping these factors before us, let us consider the minimum time allotment for organic chemistry, both general and applied. This has been set at 224 clock hours out of 2400 for the three years, divided into 128 didactic and 96 in the laboratory. The writer, for one, believes that this total of three years should be the maximum, allowing one full year for broadening the education of the student. Whether you agree or not, it is obvious that very little more time could be allowed for organic chemistry if ratio with the other subjects is about right. The limit would be 33 per cent if we allow no cultural subjects at all, which would naturally not be a healthy condition. Probably some of you would also argue that we deserve a higher proportion of the time, and maybe we do. Nevertheless, the decision has been reached by the Syllabus Committee and, unless great objection is raised, no change will probably be made. For our discussion, therefore, we will accept the figures as given.

In order to instil in the student a satisfactory idea of the fundamentals of organic chemistry, this is not more than sufficient time. Twenty-five years ago, one might not perhaps have come to such a conclusion, but today we find the materials of medicine coming from many more classes; indeed, practically every known group of organic chemicals includes at least one medicinal and usually many. It is essential, therefore, that the student become acquainted with the language, principles, and reactions in almost every chapter of our subject. Based upon many years of experience in presenting the matter to all kinds of students, the writer is convinced that the amount of time given is certainly not more than adequate for the general considerations.

However, the applications can be made at the same time. The most efficient presentation of organic chemistry is accomplished when use is made of specific compounds as illustrations, and this would be done even in a general course. If, therefore, the prominent medicinals are employed in place of the usual simpler compounds, development of the general theme is but very little retarded, and the student has simultaneously gained a chemical knowledge about the properties of the drugs he is to handle, without spending additional time. As a matter of fact, one can convincingly argue that

thorough conversance with general properties should be sufficient anyway, since one could transfer these to particular compounds at the appropriate time.

On the other hand, an added course to present the applications would involve a very great deal of duplication. Undoubtedly such a statement requires no proof for us, since applying the general properties to specific compounds must necessarily entail a review at least of class reactions. In the limited amount of time, therefore, if we assume the minimum as a total, the most efficient method should be a combined, single course.

It is admitted that there are good arguments for the duplication involved in separate courses. Repetition, as in many other lines, should be conducive to better and easier retention of the facts and theories. Indeed, the writer would be perfectly willing to accept an additional course with the consequent extensive review, providing the time was sufficient.

Under the limiting conditions and after a careful trial for each of several methods, the writer feels that the best plan would be an extended, single course. The time tentatively given by the syllabus committee calls for a total of 128 clock hours of class work, which could mean four per week for one year, two per week for two years, or some other such combination. As an illustration, let us place it at one hour per week the first year and three for the second year, with corresponding division of laboratory time. It might even be extended to three or even four years with considerable advantage. It is to be noted that this would not involve several courses, but only a continued one, a part of the subject to be considered each year.

This excellent plan of spreading the instruction over more than one year is unfortunately impracticable. In order that the students' knowledge of organic chemistry shall be of maximum value to them in physiology, pharmacology, dispensing, and in other branches of chemistry, it should be completed by the end of the second year, and naturally it is not possible to start it before the beginning of that year. This means that the instruction in general organic chemistry must be extended only over one year.

Whether or not a further review and study of applications should be given must depend upon conditions. The writer believes that a combined course for one year is pre-

ferable because of a limited amount of time and the need for using it in other lines. If five or more years were available for the undergraduate curriculum, then an added study with pharmaceutical applications would be advantageous, but in the absence of such available time, the single course seems best suited. Of course, in the schools where no control can be exercised over what is presented in the elementary study, either pharmaceutical organic chemistry must be offered at a sacrifice, or the applications must be found in physiology, pharmacology, dispensing, *etc.* In either case it would seem that some disadvantage must result in order to accomplish the purpose.

As a general conclusion, therefore, the writer recommends a single course in organic chemistry, bringing in the substances used in pharmacy and medicine as illustrations, both in the class and in the laboratory. The alternative additional course or consideration of the applications in other subjects is less desirable.

Preparing the Pharmacy Student for Research in Pharmacology and Bioassay*

HARALD G. O. HOLCK

College of Pharmacy, University of Nebraska

During the regular courses in pharmacology and bioassay there are many opportunities to capture the imagination of students and develop an interest in research. Thus, in the lectures, there is a vast difference between telling simply who discovered something in pharmacology and, on the other hand, explaining how they did it. The discovery of insulin becomes much more vital when one tells how the late Sir Frederick Banting, then a recent graduate in medicine, at two o'clock one morning, finally jotted down a few lines of directions which led to the isolation of the hormone. Through sheer perseverance on his part, this neophyte in research finally succeeded in convincing Prof. Macleod of the value of turning over all available facilities in furtherance of the insulin work. Rewards were

*Read before the Conference of Teachers of Pharmacognosy and Pharmacology at the 1941 meeting at Detroit.

not lacking, since Banting was awarded the Nobel Prize in medicine, a pension from the Canadian Government, and further research facilities; and finally a knighthood was conferred on him by the King of England. Similarly, the story of how Dr. Eijkman, a prison physician at Java, kept his eyes open while watching the sick fowls in the prison yard and noted the similarity to the disease, beri-beri, and as a result discovered what then became known as vitamin B. The discovery of ethylene anesthesia by Luckhardt and Carter from a chance observation upon poisoning of carnations by the escaping gas in a Chicago hot-house is another interesting chapter in pharmacological history.

Of course, such stories become much more vivid whenever one can persuade the person who made the discovery to tell about his work. Here is a special opportunity for the teacher himself, for his dean, and friends, to have his local scientific and pharmaceutical societies alert to secure pharmacologists of note to visit his school. Thus, we have secured the collaboration of Sigma Xi in bringing both Professor Hanzlik from Stanford and, recently, Professor Dam of Copenhagen, to tell about their pioneer work upon bismuth preparations and vitamin K, respectively. One must also take advantage of opportunities within his own school. We have been privileged to have Professor Hamilton of our own chemistry department tell our students about his research work in developing new arsenicals and, in an advanced course, I have taken students to our medical school at Omaha to have Drs. McIntyre and Bennett tell us about their work upon insulin and vitamin B, local anesthetics and so on. When the pharmacy college is located away from the greater centers of learning, the need for securing eminent visitors is the more urgent not only for the benefit of the students, but of the staff members as well.

Another method of directing the student towards research is through proper planning of the trips to the pharmaceutical houses. Although in some instances such trips may be arranged by the manufacturer principally for making contacts with future pharmacists for the sake of business, the leader of such tours should stress the opportunity to study the research methods and equipment of such houses during the visits. I know that the pharmacologists in these laboratories are always glad to tell about their work and to show what they are doing.

In one's own institution, opportunities for the teachers and research students to present their work in seminar or pharmacy club meetings should be facilitated; by this not only will the assistants gain valuable experience in presenting such material within a limited time, but the students who listen will begin to understand their teachers and their work better. Frequently students come to watch our research experiments; this should be considered a special opportunity to get some of them interested in such work, and we are always glad to explain what we are doing; I usually also try to tell about our future plans.

Recently, we have taken a further step towards interesting our students in, and preparing them for this field. We are now urging our students to work on a "bachelor's thesis" during their senior year; such a thesis will become mandatory during the year after next. The scope at present is rather wide in regard to what a student may do and write about. But we are eager to give opportunity for them to actually help us in our research problems if we consider them to be well qualified and interested in continuing with graduate work toward a higher degree. In this work, students also get considerable experience in searching the literature for general and specific information and become acquainted with various journals, review services, year-books, abstracting journals and the cumulative Index Medicus. This problem was discussed by Professor Dille in the *American Journal of Pharmaceutical Education* in 1938.

One phase of such library work needs special emphasis. In our elective courses, dealing with such fields as endocrines, vitamins, classical and modern methods of study, considerable outside reading is assigned, so that students will gain a broader perspective and thus better qualify themselves for advanced work. Here the problem of foreign languages comes into consideration. If the student does not read any at all, either he must depend upon the abstract services, which do not always give sufficiently detailed information; or he must study such abstracts with the tables and diagrams in the original that he can intelligently comprehend, incidentally picking up the foreign names of drugs, common animals, and a few scientific terms; or he must seek the aid of any qualified fellow-student who may be able and willing and has the time to help him; or finally, the professor—if he can—must

go over the most important aspects of the article in the foreign tongue, something which may be quite time-consuming. Owing to the usual financial condition of the pharmacy student, I am omitting the possibility of paying someone to do the translating. Naturally, knowledge of one or more languages is of definite value in various lines of research and in writing reviews or abstracts. However, one must always consider whether the time required in gaining the necessary facility in such reading might more profitably be used in other pursuits of knowledge; certainly the latter often would seem to be the case if a student intends to operate a pharmacy. Many universities give special courses designed to familiarize the students mainly with a scientific vocabulary in German or French, and such courses will at least give the students a considerably greater facility in inspecting tables and graphs in the respective foreign journals. However, students should not be asked in the last half year of their work to study a foreign language extensively; if it is felt that such a study is highly beneficial or helpful, it should be started as early as possible during the undergraduate work, and the person under whom research is being done should make certain that the student gets more out of the study than just a passing grade on a language reading test by actually having him utilize his acquired knowledge.

This leads to the question of guiding a student's choice of electives in his last two undergraduate years, and this depends upon which problems the department is working upon and the fields in which the student is interested. Some departments insist that the student adapt himself to the problems which the department is working upon; one important reason for this is that often departments have been aided with scientific grants and therefore committed to carry on work in the field for which the money was granted; the same thing holds when the department has agreed to help in certain problems, as for the Pharmacopoeial Revision Committee. Also, when a research professor is working in a more limited field, he is naturally interested in carrying out the experiments that his work indicates are essential for further elucidation of his own problems. However, as mentioned in the case of the exceptional Banting, a student may have such really worthwhile ideas that he should, if it is at all possible, be permitted to try them out. Returning now to

the electives, if a student seems inclined toward research, the professor under whom he may wish to work can profitably suggest to the student and his adviser whether further courses in chemistry, biochemistry, zoology, physiology, bacteriology, or even mathematics may be of greatest benefit to the student in the work he may possibly be planning to do. Thus, if the work demands considerable surgery, comparative anatomy may be indicated; if a study of a series of compounds is wanted, maybe chemistry or biochemistry; if antiseptics are being worked with, obviously more bacteriology is desirable; if a statistical problem in bioassay is undertaken, a course in statistics will greatly benefit the student; if the problem involves special or new technique of vitamin or hormone assays, the course in vitamins or endocrinology should be given more attention; and so on.

There is still another way to better prepare the student for research. Some courses may—like ours in bioassay—be offered with the opportunity for earning additional credit hours above the minimal requirements. Here, the students with such inclinations are given additional work, usually with the aim of guiding them to more advanced methods, or methods using more complicated techniques or apparatus, thus enabling them to better prepare themselves for research work either in their own school, or possibly, in another college, or with a commercial house. We are especially favored in this because we are associated with the Student Health Department and have access to an X-ray machine, an electrocardiograph, and other clinical accessories with which it will be helpful for a student to become acquainted; that holds also for the technical devices used in making sections of tissues under the supervision of a person who is qualified to instruct in such techniques.

Of course, the scientific attitude must continuously be implanted in the students minds during the daily lectures and laboratory work. That no experiment really means anything unless properly controlled should be ABC to every graduate from a pharmacy college. This becomes especially stressed in the quantitative work, that is in bioassay, in case of which comparisons are always made either with normal animals left untreated, or with animals given a reference standard. And to insure even greater accuracy, cross-over tests are employed to rule out individual variations when the number of animals is rather small.

In this connection, we wish to express the opinion that it is of greater value to the student to know fewer things really well than to have a more scattered, but less well founded knowledge. Thus, it is an advantage to the student to have experiments repeated, especially if the point of view is different in each case. Thus, strychnine may be given to a frog in physiology to teach the student the simplest technique of localizing the action to the spinal cord; in pharmacology, to demonstrate a typical example of poisoning; and in bioassay, to illustrate a method of detecting small amounts of potent poisons by the animal response. Repeated determinations upon blood-sugar are necessary to make the method something of permanent value, as done in insulin bioassay; the first time, the results show such diverse values, that the students will come to realize that particular attention must be given to each step in the analysis to assure accurate results.

The principles here enumerated for pharmacology in general, also hold for other research fields in the pharmaceutical curriculum. And, in any case, the students should be urged to attend not only scientific meetings limited to their own field, but, as an example, open Sigma Xi meetings which are devoted to various fields of research. Only thus will we get research students with a wider horizon, students who will be educated men and women. If congresses or other scientific meetings are held in their communities, they should be kept informed as to their value and urged to attend such, even if they may be held some little distance away.

Finally, if one feels that a student may be inclined toward research in pharmacology, a professor may naturally try to meet him more in a social way. Often students may come to think that all his teacher has on his mind is research work, and it may do him good to spend an evening at the home of his teacher to see that after all, he is a human being, who may be interested in such fields as music, art, history, or the like, or be inclined toward travel, photography, or fishing, at least something not associated with his drugs or rats!

Kodachrome 2" x 2" Slides as Economical Teaching Slides

CARL C. PFEIFFER AND F. F. YONKMAN
Wayne University, College of Pharmacy

Kodachrome color film has satisfied the need for better presentation of certain phases of subjects in pharmacy where colors are of prime importance. It is the purpose of this presentation to show how Kodachrome film has fulfilled a need for an economical positive black and white and color film for projection purposes.

If a 35 mm. (miniature) camera is used with a ground-glass copying attachment (Speed-O-Copy), it is possible to take 20 pictures in less than 30 minutes. These are then sent to the Eastman Kodak Co., laboratories and are returned mounted in cardboard as lantern slides. As most photographic departments have a 35 mm. camera and a copying device, the only cost involved is the expense of the film. Since Kodachrome is used, any color in the original drawing appears colored on the lantern slide. This greatly facilitates certain types of graphing. If the drawing is in black and white, only, these various shades are faithfully reproduced.

The cost is only about 10 cents per slide, and when the film is mounted permanently between glass, the cost is still only 12 cents per slide. This compares favorably with the usual price of 35 to 90 cents for the customary large-sized lantern slide. About 150 Kodachrome slides have been made at the Wayne University, College of Pharmacy, for the teaching of pharmacology. They have been used with great success.

Some Methods of Presentation in a Course in Pharmacognosy*

LEA G. GRAMLING
School of Pharmacy, George Washington University

It is not the intention of the author to attempt an outline of what should or should not be included in a course in

*Read before the Conference of Teachers of Pharmacognosy and Pharmacology at the 1941 meeting at Detroit.

pharmacognosy, for this has been done many times, but rather to give briefly a few methods he has found beneficial in helping the students learn the necessary material.

Some instructors use working sheets (1) for the study of drugs in the laboratory, and most encourage the students to take samples of the drugs for macroscopic considerations. The author has attempted to combine these two practices in the following manner. White cardboard sheets, of good grade and rather stiff, measuring 15 x 22 inches, are obtained at a very reasonable cost. The student rules these into fifteen rectangles. At the top of each rectangle is fixed, by the use of one of the common household cements, a small but characteristic sample of a drug, or, in the case of a few drugs that exist in small divisions, the samples are attached by using cellophane envelopes prepared from sheets of this material. Under each sample is then printed the pertinent data of that drug. Neatness and accuracy are required. The handling of the drug while writing the necessary data is a great aid in learning these data, for the student is associating something tangible with the information. He is better able to identify the drug and he retains the facts better because he can associate them with the official sample. Most of the students use great care in preparing these charts and use them for window displays later. Only the more important drugs are selected for this treatment, the importance being based upon the drug itself or its constituents. In order to get an idea of the effectiveness of this procedure it was not used during one semester. The grades for the class as a whole were the lowest they had been since the plan had been in effect. It is realized that this is not sufficient proof to be conclusive for there are many things involved, but it is felt that it does give an indication. The students of this class asked that the method which had been used with previous classes be used in their class during the second semester and the grades then showed a noticeable upward trend. For these reasons it is felt that the students do better work using this form of observation and study.

In order to give the student a better understanding of the constituents contained in the drugs he is going to study, exercises have been designed to show him the properties of these constituents. For example, he is given a drug containing an alkaloid and is taught how to isolate the alka-

loid. During this procedure he learns the solubilities of the alkaloids and of their salts, something of the solvents, and becomes familiar with the more common alkaloidal precipitating agents. Known alkaloids are used for comparison. In a similar manner he studies resins, starches, mucilages, etc. Since the student is taking organic chemistry concurrently with pharmacognosy he does not yet have an understanding of the chemistry of these compounds but he does have a definite idea of how a particular constituent behaves under certain circumstances and when he reads that a drug is assayed upon the basis of a certain per cent of alkaloids, resins, or other constituent he does have a definite idea of what is meant. After the consideration of the particular constituents, the water-soluble, alcohol-soluble, ether-soluble extractives and other determinations described under Methods for Sampling and Analysis of Vegetable Drugs in the U. S. P. are made. Thus when a monograph designates that a drug contains a per cent of an extractive, or not more than a specified amount of acid-insoluble ash the student knows exactly what is meant. The procedures are carried out on a semi-quantitative basis which permits gaining helpful knowledge while studying pharmacognosy and does not infringe upon the proper teaching of analytical technics which comes later. To be able to perform these tests the student must have an understanding of what constitutes an official sample, how this is reduced to the proper fineness, etc., so he is given the crude drug to prepare for the tests by grinding and sieving. The moisture content is determined by both recognized methods. After performing these exercises the student is familiar with steps necessary in determining the purity and strength of drugs and has an understanding of terms used by the Pharmacopœia while he is studying crude drugs. Harris (2) described a course in which extractions were studied apart from operative pharmacy with the expressed purpose of correlating the constituents with the extractions. The above described procedure affords this correlation with the crude drug and the galenical preparation for the student takes operative pharmacy concurrently with pharmacognosy. Through cooperation with the professor of pharmacy the study of the constituents precedes his consideration of extractives so that when the student does prepare a tincture of fluidextract containing an alkaloid he understands what type material he is handling.

Interest is created in drugs by assigning, at the beginning of the semester, a drug for a written report. The report is presented orally by the student at the time that drug comes up for class consideration. Being cognizant of the fact that to assign a topic to a student telling him to write all that he can find on that topic is unfair and of little value to him, the author spends some time explaining sources of information. The authors and titles of books are given, the existence of government and Pan-American bulletins is pointed out, the use of some journals is explained, and methods of approach are discussed. After this the student is not entirely lost when he begins to gather data. A sense of competition is aroused and the results have been gratifying. The student usually displays the drug, its official preparations, and often patent and proprietary remedies containing it during his talk. Pictures to illustrate gathering, drying, preparing and such are often attached to the paper. Only the more important drugs are assigned so that if the class were too large there might not be enough topics with sufficient interest but with smaller classes the practice has proven very successful. After the presentation of each paper time is allowed for discussions and questions.

One of the questions sent out by the secretary of this section for discussion was, "Should microscopic pharmacognosy be given in the same course with macroscopic pharmacognosy?" It is felt that the answer to this should be yes because it is not held necessary in training a pharmacist to develop a technician in microscopical analysis. However, it is felt that it is necessary that the pharmacist have an understanding of the terms and procedures employed. This can be attained in the same course with the macroscopic considerations. In this course the student is given a review of the plant tissues and then some exercises to familiarize him with the procedures employed in making permanent slides, but no attempt is made to produce a histologist. Samples of important drugs in the powdered form are distributed for study and the student is assisted in finding the outstanding characteristics of each drug as described in the U. S. P. or N. F. The powder is usually studied at the same time that the macroscopic features are, thus the student gets a more nearly complete understanding at one time. Towards the close of the second semester the student is given a key and a number of unknown

powders to identify, thus testing his application. It is felt that this manner of presentation permits the student to learn how tracheae, trichomes, fibers, *etc.*, are of diagnostic value, in other words, he can read intelligently the pharmacopoeial description of crude drugs. This is thought to be sufficient for the majority of pharmacists. If the student is interested in further work of this type there are elective courses available.

REFERENCES

- Bienfang, Ralph; *Am. J. Phar.* Ed. 3 (1939) 206
Harris, Loyd E.; *Am. J. Phar.* Ed. 1 (1937) 334

A Junior American Pharmaceutical Association*

BERNARD V. CHRISTENSEN

College of Pharmacy, Ohio State University

It has been pointed out on numerous occasions during years past that pharmacists are not as active nor as much interested in promoting and safeguarding the welfare and advancement of the profession as could reasonably be expected. In explanation of this attitude the suggestion has been advanced that this apathy or indifference is very likely due, partially at least, to the fact that pharmacists as a group are not well informed regarding the character, purposes, problems and accomplishments of their professional organizations. It has also been suggested that there is a lack of a clear and full appreciation of the value of the united and co-ordinated effort of an organization listing on its rolls an appreciable majority of the members of the profession.

The American Pharmaceutical Association has for many years been confronted with the problem of membership. It is doubtful that membership in this association has ever reached the ten per cent mark and frequently it has been less than five per cent of the registered pharmacists in the United States. Dean Charles W. Johnson in his presidential address before the association at the Portland, Maine convention in 1928 made the following statement: "I have lost hope

*Read at a general session of the A. A. C. P. at the 1941 meeting at Detroit.

of ever materially adding to our membership by inducing many retail pharmacists now in practice to join. I have come to believe that the only way to ultimately build up a large membership is to educate the students now in college, and those entering each year, into the belief that this association is necessary to their welfare." President Johnson enlarged on this statement by suggesting the organization of branches of the A. Ph. A. in the colleges. This suggestion was discussed at some length at the 1929 meeting at Rapid City, South Dakota, and as a result a joint committee representing the A. Ph. A. and the A. A. C. P. was appointed to study this question and report at the next annual convention. As a result the present plan for organization of student branches was worked out and adopted at the Baltimore convention in 1930.

This plan was designed to make possible and to encourage colleges to formulate and carry out educational programs which would inform the students—prospective pharmacists—regarding the character, purposes, problems and accomplishments of the American Pharmaceutical Association and the value and importance of a full membership in this organization in enhancing the interests of pharmacy as a profession. In President Johnson's address previously referred to he expressed his hope for the accomplishments of such a program in the following words, "I believe and I hope that every teacher believes, that membership and active participation in the activities of this association is the best way, in fact, the only way now open before us, whereby graduates will continue to grow in their professional and scientific spirit after leaving school. If the teachers believe in this as I do then they should be willing to lead the student into a feeling of need for this professional contact and not deem this type of work any more of a burden than are the duties of the class room or the laboratory."

We are now closing a decade of experience under this program, hence, it might be advisable at this point to take an inventory and consider results. According to information furnished by the chairman of your executive committee nineteen student branches have been organized in association colleges up to date. This means that one-third of the colleges of this association have taken advantage of the opportunity to kindle that spark of loyalty, pride and appreciation of the profession that President Johnson referred to in 1928. Does this

mean that only one-third of our colleges believe in encouraging active participation in the activities of the American Pharmaceutical Association and the development of a national professional consciousness? Does this mean that two-thirds of our colleges are lacking in that hope and faith in our profession and that spirit of morale which is so vital to the welfare of pharmacy? Does this mean that two-thirds of our colleges are promoting interest and activity in other associations and thus prolonging the innate weaknesses that come from divided interest and lack of coordinated effort?

With college prerequisite laws now effective in the states the coming generations of pharmacists will of necessity be enrolled as students in our schools and colleges. Hence, they can be more conveniently and probably more effectively reached as a group through the colleges than in any other way.

The future of pharmacy in the United States rests upon the colleges of today. The attitudes, the opinions, the trends of thought and the morale of the graduates are profoundly influenced by the attitudes, outlook and the morale of the college faculties. It should be possible to find some fundamental principle or objective upon which all college faculties could unanimously agree and concentrate on inculcating in the students. It is obvious that the greatest need of pharmacy today is coordination of interest and effort which can be brought about only through membership in one all-inclusive national organization such as the American Pharmaceutical Association.

Having had experience in organizing and promoting student branches I appreciate and understand the difficulties involved. The usual run of excuses is offered—lack of time, lack of funds, difficulty of speaking before an audience, what does the organization give me for my money. The student who lacks interest, ambition and understanding seems to be fortified instinctively with all the stock excuses of the veterans in practice who resist membership in professional associations. Most of these students can be won by education and when convinced they become loyal and active workers. As a matter of fact it is easier to organize than it is to maintain a student branch. The key word to success in maintaining an active student branch is "*work*". The organization must have something to do and the members must have something to do. The organization must have a function—a responsibility, and the mem-

bers must have responsibilities. Faculty members should not do the work or shoulder responsibilities. Faculties should advise, suggest and supervise activities of the student branch. Students should have as much freedom as is consistent with good judgment in carrying on the activities of the branch. Every member should have opportunities to participate in some way and frequently latent abilities and talents may be uncovered and developed which otherwise might remain dormant.

The question has been frequently asked—What can student branches do? What is the nature of the programs they might carry out in order to serve the purposes for which these organizations are set up? The programs may, and preferably should be coordinated with the course work of the members. For instance, students in the class in pharmacognosy may be requested by the instructor to prepare reports on topics assigned as a course requirement. When these reports are checked by the instructor he may find two or three that are particularly meritorious. In recognition of this, these students may be referred to the program committee and arrangements made to present these before the branch. This same principle may be applied with reference to other courses and a wealth of live up-to-date information may be presented to the group. Panel discussions involving two or more students may be arranged; debates on modern problems, exercises in parliamentary practice, biographies of noted pharmacists, historical developments in pharmacy, growth of education, growth of associations—are subjects which provide a wealth of materials which will serve to give students a broad understanding of the importance and significance of pharmacy and a keen appreciation of the place of pharmacy in our nation's economy.

An organization similar to that of the parent association may be worked out. The house of delegates might be made up of two or more members from each class. Sections may be organized—scientific, practical, commercial—and each section might be held responsible for at least one program per year. Occasionally some prominent individual who has a worthwhile message might be invited to address the group.

The time and frequency of meetings are factors which have considerable bearing on the success of these junior organizations. In the colleges with which I have been connected we did some experimenting with reference to time and fre-

quency and as a matter of fact we are still experimenting. In my experience day meetings have proven more successful than evening meetings. In one college branch meetings were held from 5 to 6 P. M. which under local conditions was in general a free hour and, hence, made a good attendance possible. At Ohio State we have reserved the four o'clock period on Mondays for organization meetings. This is recorded on the schedule card of every student and attendance is compulsory. Irregular attendance is subject to penalty of added hours for graduation.

If these organizations are of sufficient merit to warrant the support of the A. A. C. P. and the A. Ph. A., then they are of sufficient merit to warrant a place on the college program. If they are to serve the purpose intended they must be handled in a business-like manner. Wholehearted recognition and support on the part of the faculty will emphasize to the students the value and importance of junior A. Ph. A. organizations in the colleges.

With reference to frequency, monthly meetings have in my experience been found most satisfactory. Monthly intervals provide sufficient time for preparation of programs, bring meetings close enough together to maintain continuity and keep up interest and enthusiasm and at the same time avoids the tendency toward the mechanical routine which comes from too frequent and standardized programs.

The real purpose of student branches is to stimulate professional loyalty, professional activity, professional cooperation and a national professional consciousness. Hence, the original committee expressed the opinion that some provision should be made to specifically promote these principles on a national scale. For this purpose a district plan of organization was proposed but this suggestion has not been put into operation. It is herewith urged that this district plan be seriously considered and put into operation. It should be a relatively simple matter to form these junior A. Ph. A. districts to coincide with the board and college districts already set up and for students to hold their district meetings at the same time and place as the boards and colleges. Each district should have a representative in the house of delegates and this would serve not only as an incentive to hold district meetings but would serve as an incentive to local representation. Again the representatives to the house of delegates could, in connec-

tion with the convention of the A. Ph. A. hold an annual meeting of the junior A. Ph. A. and thus bind the two closely together and serve as a training ground for future activity in the mother organization. I would earnestly urge that both the A. A. C. P. and A. Ph. A. give this district and representative plan serious consideration and encourage organization and activity of the junior A. Ph. A. in every way possible. In order to make these organizations effective we must offer real and practical objectives and inducements to our prospective recruits. We cannot offer them an empty package and expect results.

What is intended to be accomplished and what can be accomplished through a junior A. Ph. A.? What we need in pharmacy today is a revival of loyalty, a revival of activity, a revival of the spirit of service to the profession. Every profession is accepted at its own evaluation and no profession can be evaluated more highly than the personalities of its membership. In order that we as pharmacists may prove our worth to the outside world we must prove our worth to ourselves. We cannot expect from society that respect and confidence which we feel our profession should have until we have respect and confidence within the profession. Consequently, consistent and persistent effort should be made to inculcate a professional pride in the minds of the students of pharmacy. They should be imbued with a conscious realization of their importance in the future development of the profession. They should be made definitely aware of the fact that the welfare of pharmacy depends on the public attitude which they will mold and maintain by the attitude which they manifest for their profession. They must be made to understand that pharmacy cannot expect a confidence and respect on the part of the public which is not clearly and definitely reflected within the profession itself. Someone must do this job and this should be a challenge to the colleges of today. This is a difficult problem yet it is one which all of us should recognize and face with courage and determination. Here is a common bond, a professional core around which could be molded every group of the body pharmaceutic. Pharmacy should be unanimous and united in professional loyalty, morale and pride.

This national professional *esprit de corps* can be accomplished through organization and not organizations because pharmacy has too many organizations already and the result

is that none of them are strong enough to represent the profession either satisfactorily or effectively. This organization must be an all-inclusive one—one that will represent all fields of pharmaceutical interest and endeavor. Pharmacy has such an organization already set up and in operation—the American Pharmaceutical Association. However, only a small percentage of the pharmacists of the United States are listed on its rolls. Yet in spite of its limited membership the American Pharmaceutical Association has a remarkable record of achievement. It has sponsored constructive legislation, created state associations, advanced pharmaceutical education, fostered the United States Pharmacopoeia, produced the National Formulary, supported the enactment of Federal Food, Drug and Cosmetic acts and sponsored research—a record of accomplishment of which anyone could be justly proud. When we think of what has been accomplished by the A. Ph. A. with its limited membership it would not be venturing too much to conjecture that with a majority of the body pharmaceutic in one national organization pharmacy would soon be in a position second to no other profession.

It has often been said that united effort and cooperation can be brought about through faith and understanding. The students in our colleges must be informed concerning the fundamental issues and objectives of pharmacy. A junior American Pharmaceutical Association offers a means whereby this may be accomplished. It is desirable and advisable to think these problems through, to discuss them with others and to consider ways and means. However, it is not enough to think and discuss and consider, we must have action. We not only must have action but united and concerted action. All colleges must join in this movement if we are to accomplish the purposes and bring about the results desired. I can conceive of no question of concern to any group of the pharmaceutical family which can not be given full and fair consideration through the instrumentality of the American Pharmaceutical Association. There is no question of concern to the profession as an all-inclusive body which can not be impartially investigated and acted upon as facts and truth may indicate. What we need, to bring about a correlation of the scattered forces of pharmacy, is a whole-hearted and broad minded professional consciousness, the ability to look ahead and to envision the profession as a composite body striving for the common welfare. Here is the job for a junior American Pharmaceutical Association.

A Step Toward Closer Cooperation Between Industry and Colleges of Pharmacy*

ERNEST LITTLE

Rutgers University, College of Pharmacy

"Resolved that the National Drug Trade Conference express its approval of the formation of the American Foundation for Pharmaceutical Education as an independent agency, and be it further resolved that the Conference urge its constituent members to participate in the formation of the American Foundation for Pharmaceutical Education and to do everything which they deem proper and appropriate to insure its success."

The above is, in essence, the resolution which was unanimously passed by the National Drug Trade Conference at its meeting in Washington, D.C., on Wednesday, December 10, 1941, and represents the culmination of three years of hard work on the part of the Committee on Endowment of that organization. The Committee feels that the action of the Conference, above referred to, should prove a source of encouragement to pharmaceutical educators and a satisfaction to everyone engaged in the various branches of the profession of pharmacy. It indicates that the profession has at last recognized and accepted the fact that the common interests of the profession are more significant and fundamental than certain important differences which have existed and possibly always will exist between different groups engaged in different phases of the profession's activities.

The various branches of the profession will always have different major responsibilities, and it is indeed fortunate that not all of us will ever think alike. Such a condition makes for progress, provided we maintain a healthy regard for the other fellow's opinion.

Recent developments clearly indicate that the members of the profession of pharmacy are seeking to discover and assemble all the interests which the various branches of the profession have in common and, with these as a foundation, go

*This article was written at the request of the Editor, by Dean Little, chairman of the Committee on Endowment of the National Drug Trade Conference in order to state the progress being made by that Committee.

forward with a united front in the interest of the profession as a whole. It is only by so doing that substantial progress can be made. No profession should expect to command respect from the outside until it has obtained internal harmony, understanding, and properly coordinated endeavor.

The formation of the American Foundation for Pharmaceutical Education is an indication that the above objectives are being achieved by our profession. Much still remains to be done if the Foundation is to prove successful, but its formation with adequate and proper backing is in itself an accomplishment of importance.

It is impossible to give a detailed report of the work of the Committee on Endowment in this article. It is difficult to present it in sufficient detail to make it worthwhile without utilizing too much space.

The Statement of Purpose and Program, in its modified form, as read at the December 10th meeting, is as follows:

Statement of Purpose and Program

"The purpose of the Foundation is to receive, administer, and allocate a fund, or gifts, to improve and broaden the profession of pharmacy through educational processes. The Foundation will uphold and improve pharmaceutical education by aiding and strengthening colleges of pharmacy through such means as the directors deem appropriate and in keeping with the best interests of the profession of pharmacy and the people whom it serves."

"The program of the Foundation must, of necessity, be left largely to the good judgment of the Board of Directors. But in developing the program, the directors will have constant regard for the responsibilities of the colleges of pharmacy:

- "(1) To provide an adequate, well-trained and reliable personnel to man the retail pharmacies of the country; and
- "(2) To furnish pharmaceutical industry and allied manufacturing concerns, hospitals, governmental agencies, college faculties, and other professional fields with technically and scientifically trained personnel.

"The first responsibility is met by a strong undergraduate program; the second, primarily, by sound graduate work.

"It is not wise to limit minutely the decisions of the directors; however, they will feel obligated to confine their decisions and restrict their activities to the special field assigned to them.

"The Foundation shall, so far as possible:

- "(1) Help worthy colleges to develop strong undergraduate programs;
- "(2) Support graduate work in colleges which they deem qualified to carry on such programs in a creditable manner;
- "(3) Encourage scientific research, both as a necessary component of graduate work, and as special projects; and
- "(4) Render such general and special help as they consider wise and appropriate, such as the maintenance of scholarship and loan funds for worthy students and the promotion of other projects to numerous to be mentioned individually.

"The Foundation shall not:

- "(1) Make grants for other than specific purposes;
- "(2) Make contributions to capital deficiencies;
- "(3) Render financial assistance to colleges which do not show fair promise of being able to make a worthy contribution to the field of pharmaceutical education.

Organization and Finances

"The policies and operation of the Foundation will be controlled by an unsalaried Board of Directors. The membership of the Board shall consist of one representative each from the American Drug Manufacturers Association, the American Pharmaceutical Association, the American Pharmaceutical Manufacturers' Association, the Federal Wholesale Druggists' Association, the National Association of Boards of Pharmacy, the National Association of Retail Druggists, the National Wholesale Druggists' Association, the Proprietary Association of America, and two representatives from the American Association of Colleges of Pharmacy, and, during his term of office, the Chairman of the Executive Committee of the American Association of Colleges of Pharmacy.

"The directors shall have equal rights and responsibilities, and shall constitute the managing body of the Foundation. They shall be responsible for the Foundation's funds, both principal and income, but the allocation of funds or other gifts, shall be made by a Board of Grants of five members who do not actively participate in any branch of pharmaceutical work but who are well qualified persons, preferably engaged in the general field of professional education.

"An Executive Committee of six members, which shall include one of the representatives of the American Association of Colleges of Pharmacy, may transact the Foundation's

business between meetings, but all members of the Board of Directors shall have the opportunity of voting on recommendations to, and allocations by, the Board of Grants. Such votes may be taken by mail, in emergency only, on the basis of adequate information furnished by the Executive Committee.

Meetings

"The directors of the Foundation shall hold one regular meeting annually, during the third week of August, and such special meetings as they deem advisable.

Annual Report

"The President and members of the Board of Directors shall publish an annual report, setting forth important items in the operation of the Foundation. Copies of such report shall be obtainable upon request to the Secretary."

List of Members and Officers

(When elected)

The above statement is but an informal outline of some of the things which the Foundation hopes to accomplish and how it proposes to go about doing so. It is not in finished form and will in all probability be further modified when the Directors and other Founders assemble for an organization meeting early in 1942.

The Certificate of Incorporation as reviewed by the Conference is as follows:

Certificate of Incorporation

(Pursuant to Membership Corporation Law)

"We, the undersigned, desiring to form a corporation pursuant to the Membership Corporation Law of the State of New York, do hereby make, sign and acknowledge this certificate, as follows:

"FIRST: The name of the proposed corporation is:

THE AMERICAN FOUNDATION FOR PHARMACEUTICAL EDUCATION.

"SECOND: The purpose for which this corporation is to be formed are exclusively scientific and educational, to wit:

"(a) To accept, receive, hold, invest, reinvest, and administer gifts, legacies, bequests, devises, funds, benefits of trusts (but not to act as trustee of any trust), and property of any sort or nature, without limitation as to amount or value, and to use, lend, apply, employ,

Cooperation Between Industry and Colleges of Pharmacy 115

expend, disburse, and/or donate the income and all principal thereof for, and/or to devote the same to, upholding, improving, broadening, and otherwise fostering, promoting, and aiding pharmaceutical education;

"(b) To uphold and improve pharmaceutical education by aiding, in such ways, and in any and all ways consistent with the purposes of the corporation, colleges of pharmacy and students therein;

"(c) To aid in the creation of sources of unbiased and authoritative investigation and experimentation on pharmaceutical problems;

"(d) To afford, in such ways, a safeguard to the public and an aid to all pharmaceutical interests;

"(e) To assist in the selection of important research problems and to provide that the investigations be adequately financed, and to insure as far as possible that they be carried out by competent investigators under the supervision of recognized scientific authorities.

"(f) To have, enjoy and exercise all the rights and privileges granted by law to the corporation, without any limitation or restriction by reference from the terms in any other clause in any other part of this certificate, but the purposes and powers specified in each of the clauses of this certificate shall be regarded as independent and separate purposes and powers.

"This corporation shall not be conducted or operated for profit, and no part of the net earnings, or of the properties, or of the assets of the corporation shall inure to the benefit of any member. In the event of the liquidation or dissolution of the corporation, whether voluntary or involuntary, or whether by operation of law, none of the property of the corporation, nor any proceeds thereof, nor any other assets of the corporation shall be distributed to, or divided among, any of the members of the corporation.

"**THIRD:** The territory in which the operations of the corporation are principally to be conducted is throughout the United States of America.

"**FOURTH:** The principal office of the corporation is to be located in the Borough of Mannattan, City, County, and State of New York.

"**FIFTH:** The names and addresses of the subscribers to the certificate are as follows:

| Name | Address |
|------|---------|
|------|---------|

(at least five)

"**SIXTH:** The number of directors shall not be less than eleven, nor more than twenty-five, as shall be provided in the By-Laws.

"**SEVENTH:** The names and residences of the directors until the first annual meeting are as follows:

| Name | Residences |
|------|------------|
|------|------------|

(at least eleven)

"**EIGHTH:** All of the subscribers to this certificate are of full age; at least two-thirds of them are citizens of the United States; at least one of them is a resident of the State of New York; and of the persons named as directors, at least one is a citizen of the United States and a resident of the State of New York.

"**NINTH:** The corporation shall have perpetual existence.

"IN WITNESS WHEREOF, we have made, signed and acknowledged this certificate this _____ day of _____, in the year one thousand nine hundred forty-two.

_____(L.S.)
 _____(L.S.)
 _____(L.S.)
 _____(L.S.)
 _____(L.S.)"

This statement is not possessed of too much flexibility and after it is adopted will not lend itself as readily to modification as will the By-Laws and the Statement of Purposes and Program. For these reasons the Certificate of Incorporation will again be critically reviewed and minor and possibly important major changes made.

The By-Laws, covering some fifteen typewritten pages, are much too lengthy for presentation here. Their objective, however, is merely to put the principles outlined in the Statement of Purpose and Program and the Certificate of Incorporation into workable form. This naturally involves considerable detail, probably more than should be presented in any journal article.

We shall endeavor to send a more complete statement, including the By-Laws of the Foundation, to each pharmacy college dean as soon as possible. However, the pressure of the work of this committee at the moment is not inconsiderable and we bespeak your patience if this additional information does not arrive as soon as we hope it may.

We are certain that the American Foundation for Pharmaceutical Education will have the interest and support of every pharmaceutical educator. We shall do our best to see that it develops into a worthy and helpful organization. Whatever the results may be, it has been fun working for its formation, and time and energy and labor devoted to a worthy cause are never entirely wasted.

Deans Ernest Little and H. Evert Kendig have been named by the Executive Committee as appointees to the board of directors of the American Foundation for Pharmaceutical Education subject to confirmation by the Association at the 1942 meeting at Denver.

Editorials

Concerning the Annual Meeting

Perhaps enough has been said about the program of the Detroit meeting, but your secretary feels an urge to try to clear up some apparently obscure points. Conferences of teachers may control their own programs; officers of the Association have nothing to say about them.

It should be understood that much of the work of the Association is done by committees and those committees must report so that we may know what is being accomplished. If there is too much business undertaken, some activities must be given up or we must have more days of the convention week or reports must be shorter.

Dropping certain activities is more easily said than done. Every year there are more and more opportunities to take up new and worthwhile projects. The observer may have noticed the frequent recommendations for the appointment of new special committees. It has long been the policy of the Association to refer any new project, if possible, to some existing committee rather than create a new one. Length of reports is the heart of the matter. A report should be as long as necessary to cover the subject adequately, no longer. If that means a lengthy one then *it should be presented in abstract, reading time not to exceed ten minutes*. Some years ago, the Association went on record to that effect: no report to take more than ten minutes reading time except for some unusual reason. *Annually*, since that time, your secretary has notified *all new* committee chairmen and most who have served before that this is the rule. What are we to do about it? Shall a rule enforcement official be added to our officers? The president can hardly spend his time watching a clock.

Your secretary is of the opinion that each year quite a number of reports need not be read at all, but who shall draw the line unless the writer of the report will?

Printing reports prior to the convention is not feasible for *important* ones and those *containing recommendations*. It has been decided that (except in years when the convention comes in May) the October issue of the Journal will be the one which will contain all convention business. There would

be much confusion if the reports themselves were in the July issue, the recommendations and the action on them in the October issue. Even though many should read the report before coming to the convention, some of it would have to be read again to get the subject matter before the meeting for action. Mimeographed copies for distribution would add an item of expense when limited funds are much needed for more important things.

The constitution says that the object of the Association shall be "to promote *pharmaceutical education and research*". Nevertheless the Association has accepted as a responsibility the matter of hours and salaries. A joint committee charged with that task rendered a preliminary report at Detroit, a report which was neither long nor dull. Having seen the material that has already been accumulated, your secretary desires to say that the committee has undertaken a stupendous task, and it cannot be accomplished overnight. In the meantime, if more people sat through the reading of reports, more would know what the Association is trying to do.

The joint session is much too long. There is no apparent reason why the reports for this session should not be presented in abstract. Chairmen of A. A. C. P. committees have been reminded of the limited time available. Careful perusal of many reports of district meetings indicates that a very large percentage of the material is of local interest only. That is a good reason for our having a general chairman to glean for us the things of interest, and this sorting has been well done. Discussion of these individual reports in the joint session, eight of them, would consume the time of the entire session.

As to "controversial" matters, some will recall too many occasions when there have been verbal fireworks that left bad feelings. Faulty as it may seem, the present plan seems better. In brief, that is to present at this session reports that are of interest to *all three* associations, some of which otherwise would have to be read two or three times.

Lest some may be saying, "Ah, the shoe pinches", your secretary will be pleased to have you look at the length, the shortness rather, of any of her reports (financial statements are never read) and reminds you that planning the programs is no part of the duty of the secretary.

Zada M. Cooper

Iowa, Kansas and Purdue Make Five

There is satisfaction in seeing the fruition of one's efforts along any line, especially when that effort was made not for one small group of women pharmacists, but with the hope that many throughout the United States might eventually share in the "rights and privileges pertaining thereto." So it is good to report that the degree of Bachelor of Science in Pharmacy given at the State University of Iowa College of Pharmacy has been approved by the American Association of University Women, thus making alumnae of the College eligible for membership in the national society. Five colleges in the United States have now had their degrees approved: the University of Michigan, Temple University, Purdue University and the State University of Iowa, the last three having been added last year.

Approval of the degree should be sought by other colleges, but each must do it individually. The fact that a college is a part of the greatest university in the United States will not get recognition for the degree it gives. The fact no doubt helps in many ways, particularly if some other college in the institution has already been approved. The course of study must meet certain specific requirements. It must include *"a minimum of sixty credit hours of non-professional, non-technical work which would be credited for the A. B. degree."* Those schools whose foundational courses are given along with other schools in the same university should have little difficulty, particularly if the institution's A. B. degree has already been approved. An independent institution that gives all its courses within itself may have to show in some way that its foundational courses are comparable to those given in universities.

Quoting from a recent article, "to be accredited, a college must possess academic excellence in its liberal arts courses and *must be alert to the housing and care of women in these schools.* Acceptance of the rating of a college or university rests with the committee on membership and maintaining standards which accepts as its basis for judgment the findings of the Association of American Universities, the Association of American Medical Colleges, the American Library Association and the American Association of Teachers' Colleges."

The American Association of University Women is more

than fifty years old, has grown from a membership of 17 to 71,000 alumnae of colleges and universities of high standing. It is affiliated with an International Federation of University Women. The approved list for 1941 includes 240 institutions.

Quoting again, "through a membership policy which requires high academic standards and provision both for the welfare and recognition of women in such schools, the American Association of University Women supports the establishment and maintenance of high standards for education in colleges and universities." The local chapters are scattered over the country and are carrying on actively through general programs with speakers of prominence on international situations, educational and legislative problems, social aspects of life and many others. There are also study groups on many lines, and social affairs.

Those schools that wish to make the effort in behalf of their alumnae will find that a bit of patience will be necessary. Perhaps it is because a large number of schools are clamoring for recognition that getting it is not a quick process. The committee on membership and maintaining standards does not meet frequently, so a request for consideration may have to wait several years. Correspondence should be addressed to Miss Mary H. Smith, Secretary, Committee on Membership and Maintaining Standards, American Association of University Women, 1634 I Street, N. W., Washington, D. C.

Zada M. Cooper

(Miss Cooper will be glad to advise anyone who is interested about how to proceed.—Editor.)

Regarding The Shortage Of Registered Pharmacists

"Why is it that more young men and women are not attracted to pharmacy as a career?"

This very important question was discussed in New Orleans at a recent meeting of the Southern Service Drug Wholesalers. Several reasons were offered, among them were the lengthy and expensive period of training and the long hours, but the most important reason, in the majority of opinion of this group, was the deprecating attitude of drug

store owners towards their own businesses. Young people are naturally discouraged from going into a business which so many druggists condemn—often with more force than elegance! These young people are given to understand that being a druggist means years of expensive preparation followed by long, onerous hours—and all for what?—a pittance—a bare livelihood. They are not told that the average druggist makes more during the eight years following graduation than the average doctor. And that his earnings thereafter are only slightly under those of the average doctor. And yet these are facts. They are not told that more money can be made on a small investment in the drug business than in any other, and that as the guardian of the public health, the character of the druggist plays a bigger part in his success than is true of any other business, which means to the right sort of druggist, a deep satisfaction in his work,—a sense of service well done,—which no other business offers in equal measure. There are many druggists who are proud of their calling and glad to be identified with it. Most of them have invested their surplus earnings in their business,—in merchandise and in their places of business—and have gained security for their declining years. Among the “knockers” will be found numerous druggists who have lost their savings in outside investments. They did well in the business they knew, but not so well in ventures outside their ken. Let us admit that the drug work has its disadvantages. But let us be fair and admit that they are mostly of our own making and could be corrected if we had the will to do it. Let us stop blaming an ancient and honorable calling we can be proud of, for things that should not and need not be. And finally, let us boost our work to the youngsters who will be the druggists of tomorrow. Let us change our tune and sing a hymn of praise to a profession which pays dividends not only in material things, but in service to humanity and the spiritual values which such service engenders. And if you cannot go that far, at least show them both sides of the picture and make it clear that the bad side is mostly your own fault.

John F. McCloskey,
Loyola University, New Orleans

The Editor's Page

At the meeting of the National Conference of College and University Presidents on Higher Education and the War, which was held at Baltimore on January 3 and 4, under the sponsorship of the Committee of Military Affairs of the National Committee on Education and Defense and the United States Office of Education, the problems affecting education in relation to the prosecution of the war were discussed and many recommendations were made and adopted. These had to do with such problems as the allocation of total manpower, the allocation of total educational program, credit for military service and the application of the principle of Selective Service so as to best utilize specially trained manpower most advantageously. In the latter instance, the Conference went farther and recommended that the Selective Service System be requested to make adequate provision for the deferment of bona fide premedics, pre dental and pretheological students so as to protect the source of supply of students for the professional schools. Attention was also called to the necessity of providing occupational deferment for selected individuals pursuing graduate work. It may be inferred that no mention was made of pharmacy students in the report of the Conference, since the source of supply is the high school and not the college level. On another page of this journal is to be found printed in full, President Kuever's Bulletins, Numbers 5 and 6. In Number 5 he states a series of questions relative to the shortage of pharmacists and the need of and wisdom of speeding up the educational program and the possible effect such a procedure will have upon pharmaceutical education and practice during the duration of the war and after peace comes. In Bulletin Number 6, are given some of the opinions of the deans who have replied to the question at the time of writing. The consensus of opinion of this group seems to be that this is the time to be calm and not change our program until the time comes when it can be shown that there is a definite need. Then it will be our patriotic duty to do so. Just now our patriotic duty is not to let the excitement and passions of war create chaos in our educational program. To create chaos would be most helpful to the enemy.

One may well ask the question—will not the speeding of

our professional programs lessen the number of students in our colleges and therefore the number of graduates to be turned out rather than increase them? If this should happen, then the speeding up process would defeat its own objective. A census among the pharmacy students at the University of Nebraska reveals that fifty per cent of them must have the summer in order to return to school. In the medical school, twenty per cent say they cannot go to school continuously unless they are subsidized. I know one medical dean who says eighty per cent of his students require the summer vacation as an economic necessity. Furthermore, if the professional course of four years is shortened to three in order to keep the stream of students constant, it will be necessary to shorten the pre-professional period on the college level, then in the high school period, and if one thinks backward far enough, we come to the inevitable conclusion that we must ask the future mothers of men to bear their babies twelve to twenty months earlier than the schedule that they are now on.

It would hardly seem necessary to discuss here the deleterious effect of continuous operation of a teaching program upon both the quality of the teaching and upon the student. We have been trying to get away from that system for nearly half a century. At last, the effort was crowned with success. Shall we return in education to the same system we use to force feed turkeys for the Thanksgiving market? Speeding up the program will do that very thing. If we are forced to do it, we will still find comfort in knowing that the boards of pharmacy and thousands of retail druggists throughout the country have in these latter days registered their voices in no uncertain terms against shortening our educational program.

I have raised the question in my own institution as to what will happen if all departments except pharmacy should go on a continuous program. The question has not been answered, but it is evident that there could be no coordination in schedules unless the whole university went on the same basis. A level headed chancellor has given assurance that while plans are being laid for a speeded program, no changes will be made until orders come from Washington or from some other party to whom authority has been delegated.

As I finish this paragraph, word comes from the Nebraska State House that Assistant Attorney General Clark on January 17, ruled that the University of Nebraska, College of Medicine cannot legally reduce its present four year course

to three years. The opinion expressed is that the language of the law means that four separate years must be involved in the course of instruction in order that these four courses of lectures may be given and at the same time no two of them may be given within one year. If the law is not observed, the school cannot be approved by the State Department of Health and would not be subject to accreditation. The statute is not clear whether the word "year" means a school or a calendar year. If this point cannot be clarified it would seem to make it impossible for a school operating on a three year basis to be accredited in Nebraska.

History repeats itself. On July 2, 1917, soon after we were in World War I, I received a letter from the Editor of the N. A. R. D. Journal, from which I quote as follows:

"I am sending you under separate cover a copy of the N. A. R. D. Journal of June 28th in which begins a series of 'Little Lessons in War-time Service,' designed to afford druggists an opportunity of acquainting themselves with the duties required of them if they enter the defense of the nation.

"I should like to have your opinion on the value of this instruction, not necessarily for publication, but rather as a guide to further activity along this line.

"While I am in favor of a wider recognition and a better standing for pharmacists in the defense service, I feel that at the present time, as an emergency really exists, the best thing for us to do is to equip ourselves so as to perform the duties in the station that we now occupy. If we can show a willingness to take up these duties, despite the lack of recognition in the matter of rank, I believe we shall be in a better position to present our demands for the introduction of real pharmacy into the various arms of the defense service.

"It needs no argument that one must start at the bottom, and to my mind a start is what we want at the present time more than a complete achievement.

"I should appreciate very much anything you may have to express in the way of an opinion in regard to this entire matter."

"Little Lessons in War Time Service" turned out to be a series of simple lessons in first aid. Under date of July 17, 1917, I made the following reply:

"Your letter asking an opinion on 'Little Lessons in Wartime Service' received. I do not find myself heartily in sympathy with the movement. It is practically the same instruction we are now giving the young women all over the country in our Red Cross First Aid courses. It is, of course, information that everyone should have, but I think it really lessens the chances of pharmacists getting the recognition that they wish in the public service. Furthermore, it puts pharmacists in a

very subordinate position in the minds of physicians, as well as the public, and everyone will wonder if there is not some more important service that pharmacy can render to the government. For example, Dr. L. B. Sturedvant, who has been in the army medical work on the Mexican border for more than a year, asked me why we did not have some pharmacists in the service. When I asked him if the medical department really had need for pharmacists in its work, he replied that in connection with his work they had a stock of drugs valued at \$40,000 and no man to take care of it. (Dr. Sturdevant said when he wished some petrolatum he was served out a ten pound container by a buck private using a shingle. Here is an instance where there is really something for a pharmacist to do and where the service is certainly impaired because of the lack of a pharmacist.)

"It seems to me that your journal could render a great service to pharmacy if it could run a series of articles upon the work of a purely pharmaceutical nature to be done in the army service, and have these articles written by men who know what the specific work is that should be done in caring for drug stocks in the army hospital, upon the battleship and upon the field. Undoubtedly there are other functions that a pharmacist might perform in military service which are strictly of a pharmaceutical nature. If we should work along these lines, instead of trying to usurp the functions of the doctor and the first aid nurse, I think we should command greater respect from all parties concerned. If we ever make any headway, we must show that we can render a service which is not already being done by other professions or organizations."

After four and twenty years, if we are to judge by what we read in the papers, we have not got beyond the first World War stage in our thinking. The stress which is now being placed upon making our drug stores first aid stations is misleading to the public. The layman already thinks of the drug store as a first aid station. In case of necessity for first aid materials or service, he could never think of going to a grocery store or to a potato chip factory. Even with the efforts to make the filling station a first aid station, the layman still goes to the drug store when it is within reach. One criticism that has been made of Pharmacy Week, is that it makes the drug store a public health institution only one week in the year instead of fifty-two weeks. A drug store is a first aid station all the time. Druggists should be trained in the scientific administration of first aid far beyond the courses which are given to boy scouts, or campfire girls and the official Red Cross Course, which is given by "qualified Red Cross instructors" is entirely inadequate for the training of the druggist. But let us not permit a minor function of the druggist to stand as his most important function either in time of peace or of war. The medical viewpoint as stated by a medical man as stated

below is much more comprehensive. I quote from an editorial which appeared in the days of World War I, and was published in the June 16, 1917 issue of the *Journal of the American Medical Association*. It was entitled *Justice to the Pharmacist*:

"Physicians, dentists and veterinarians are officially recognized by the Government as men of special training, whose technical knowledge can be of use to the nation in time of war. Provision is made so that men in these three professions can be enrolled as commissioned officers, and their skill most efficiently used by the Army. Today as never before, victory in war goes to the nation that most effectively conserves the health of its fighting men. The physician is now of such military importance that the medical profession will be called upon to make no inconsiderable sacrifices. It will materially lighten the arduous duties and responsibilities of the physician to have in the army trained pharmacists who will be able to give intelligent cooperation. But it is imposing too great a strain on the patriotism of those whose special knowledge is obviously a large asset to the Army to expect them to enlist as privates without any recognition of their national worth. Pharmacists should be given a rank commensurate with their importance, first, because it is but simple justice to the pharmacists themselves, secondly, because the usefulness of the medical corps will be greatly augmented and, lastly, and most important, because the efficiency of our Army demands it."

When we all get that medical man's vision and appreciation of pharmacy and the pharmacist, we will be in position to insist that the pharmaceutical service in the Army shall be equivalent to what the layman demands of the pharmacist in civil life. We are fast approaching that position.

The officers, delegates, representatives and committeemen of the American Association of Colleges of Pharmacy are appreciative of the many suggestions and criticisms which were made toward the improvement of our annual program. Especially appreciative are we of the frankness of expression. Only by such frankness, given in the spirit of helpfulness can progress and improvement be made. Many have stressed the tiresomeness of long reports and in this they are justified. Of all guilty parties in giving long reports, the Editor has been the limit. It should be stressed, that the criticism is not of long reports, but of giving them in detail in the meetings. The life and usefulness of any organization depends upon the work of its committees. A committee which works at its assignment throughout the year cannot possibly give a complete record of its work in ten minutes. But it can give

a summary of its efforts and its accomplishments and summarize them in such a way that the Association can discuss them intelligently and thus help the committee on resolutions to act intelligently upon any recommendation made. What the Association needs more than anything else is to have the committees more active in their work. One of the regrettable tendencies in the Detroit meeting was the apparent desire to eliminate a number of committees and concentrate the work in a few. If this is done, then the committees should be enlarged and assignments made to several subcommittees. One trend was seen in the change of the name of the Committee on Curriculum and Teaching Methods to the Committee on Teaching Methods. There is certainly a vast field for a Committee on Teaching Methods in which to work, but the curriculum part of the work was evidently dropped because of a possible duplication with the work of the Syllabus Committee. The fact should not be lost sight of that the American Association of Colleges of Pharmacy is an organization of institutions for the purpose of promoting education and research. As such, this Association is the curriculum building institution and the responsibility for doing that rests upon the Association and its committees. The Syllabus Committee is the product of three associations, of which the A. A. C. P. is one. The value of the Syllabus Committee lies in the fact that through our representatives, we can cooperate with the other organizations holding representation on the committee and coordinate the contributions of all three associations. The Association is not answerable to the Syllabus Committee, but the Committee is to these three associations. In the future as in the past, new ideas as to curriculum building are going to come out of and be tried out in our teaching institutions. What other institution has the machinery for experimentation and testing?

In like manner, the American Council on Pharmaceutical Education is a product and the tool of the three associations. Its primary function is to set standards and provide the machinery for accrediting. Three of its members are answerable to the American Association of Colleges of Pharmacy. Can you imagine that it could possibly set standards that would be so revolutionary that the schools could not possibly comply with them? If they did, the schools would forget the Council and operate under their state laws and supply their own commonwealths with druggists. Nothing would be more

suicidal to both the Council and the profession and it is hardly conceivable that such a condition would be allowed to occur by a group of sincere and thoughtful men. It is to the advantage of pharmaceutical education that the Council and the Syllabus Committee cooperate in our curriculum building and suggest problems to be tried out in our proving grounds. In other words, the American Association of Colleges of Pharmacy still has a function and still has the destiny of pharmaceutical education and practice in its hands.

Many have paid tribute to the passing on October 8, 1941, of William Perry Porterfield, of Fargo, North Dakota at Harrisburg, Pennsylvania. He was born on December 20, 1855 near Martinsburg, Virginia, (now located in West Virginia). He graduated from the Philadelphia College of Pharmacy in 1878 and in 1882 he went to Dakota Territory and established the town of Davenport in which he constructed the first building and operated a drug store for ten years. Then he moved to Fargo, purchased a store which he operated until 1916 when he sold out and devoted the rest of his life to other interests. He, however, never lost his interest in pharmacy. From 1902 to 1904 he was president of the North Dakota Pharmaceutical Association. He was the war president 1917-1918, of the National Association of Boards of Pharmacy. In 1930 he was elected to honorary membership in Rho Chi and the year before his death, was honorary president of the American Pharmaceutical Association. At one time he was state senator from his district and he held many positions of trust in civic life. He was a rugged individualist with his interests as wide as the prairies he loved and his personality as mellow and lovable as the Dakota sunshine in the days of spring. There were giants in the earth in North Dakota in those days and William Perry Porterfield was one of them.

Rufus A. Lyman.

"There is no sense in rising in rebellion to change, and the sooner we learn this lesson the better fitted we will be to buck the tides. * * * With all its troubles and all its joys the world goes on. There are greater, and ever greater days ahead for this country, and the smart man is the one who studies the direction from which the wind blows and charts his course accordingly."—Robert L. Swain.

Gleanings from the Editor's Mail

We greatly appreciate the American Journal of Pharmaceutical Education.

Chengtu, West China
October 9, 1941

E. N. Meuser
West China Union University

The National Science Fund, of which the president of the American Association for the Advancement of Science is a director by virtue of his office, deserves the support of every scientist and scientific worker.

I hope you will be able to call the attention of all your members to the National Science Fund so that they will be familiar with its purposes.

December 1, 1941

Irving Langmuir, President

I read with interest the editorial entitled "The Menace of Druggists to Pharmacy" in the last issue of the Journal. I am very much in accord with the statements expressed in this editorial and brought it to the attention of my second and third year classes, asking them the same two questions that you asked on page 610, with the following results:

Of 19 students in one class, 10 answered the first question in the affirmative, and 5 answered the second in the affirmative.

Of a second class of 38, 23 answered the first question in the affirmative and 5 answered the second in the affirmative.

To my mind this implies a severe indictment to our profession. This might be one explanation as to why we are progressing so slowly. The editorial certainly attracted much comment from the students in these two classes.

December 5, 1941.

Henry M. Burlage
University of North Carolina.

I am sending you a brief editorial (See Editorial page) which was sent out to the retail pharmacists of New Orleans by one of the local drug jobbers in that city. Dean McCloskey tells me that this publication goes to about 7,000 customers.

I thought it was very good, and I thought, too, that it seemed to fit in very well with one of your recent editorials. I thought you might like to read it and possibly comment on it in one of the numbers of the journal.

If we could have editorials of this sort presented to more retail pharmacists, I believe it would be most helpful in attracting a better quality of student to our colleges of pharmacy.

December 2, 1941

Ernest Little
Rutgers University

In the current issue I think your editorial on "The Menace of Druggists to Pharmacy" is excellent and it expresses a sentiment that I have been trying to present to the people in this vicinity for a number of years.

November 29, 1941.

Henry S. Johnson,
University of Connecticut.

130 *American Journal of Pharmaceutical Education*

I have just received a copy of the *American Journal of Pharmaceutical Education* and read with great interest your editorial on "The Menace of Druggists to Pharmacy". It is a coincidence that we should have an article appear in two separate journals at such a great distance apart in the same week on the same subject. I am enclosing one that appeared in the December number of the *Southeastern Drug Journal*. (See Editorial "Retail Pharmacists Must Influence New Pharmacy Students" page 10 S. P. J.) It seems that we have exactly the same idea as to the feeling that so many retail pharmacists have toward the profession.

December 11, 1941.

R. L. Crowe,
University of Tennessee.

Iowa City, Iowa
December 31, 1941.

Dr. George F. Zook, Pres.
American Council on Education
744 Jackson Place
Washington, D. C.

My dear Dr. Zook:

The American Association of Colleges of Pharmacy, consisting of 59 member colleges located in nearly every state in the Union, desires to place its facilities and resources at your service and at the service of your committees during the emergency.

The Association is giving careful attention to changes that may be desirable for the duration in the courses leading to the degree Bachelor of Science in Pharmacy.

If I recall correctly, it was through the suggestion of the American Council on Education that the American Association of Colleges of Pharmacy assisted in 1917 in connection with the formation of S. A. T. C. pharmaceutical programs.

Please know that the American Association of Colleges of Pharmacy is firmly resolved to accept every pharmaceutical responsibility, and to meet every demand for service made upon it. It is anxious to be of help to the American Council on Education in any way that you or your committees may suggest.

Yours very truly,
R. A. Kuever, President.

Your publication is improving steadily due to some extent I think to a greater diversification of material. At any rate, I should not wish to be without it.

To Miss Cooper
January 8, 1942.

S. H. Dretzka, Secretary
Wisconsin Board of Pharmacy.

Notes and News

The American Institute of the History of Pharmacy.—Director George Urdang has been appointed the official historian of the American Association of Colleges of Pharmacy.—Early in November Dr. Urdang gave three lectures at the Purdue University, School of Pharmacy. Retail Pharmacy as the Nucleus of Pharmaceutical Industry was the subject discussed before an open forum. Pharmaceutical Ethics and Pharmaceutical Solidarity was given before the class in history of pharmacy and ethics, and Pharmaceutico-Historical Research was the subject presented before a seminar attended by graduate students and faculty members.—When the Kremers-Urdang History of Pharmacy was written, it was Dr. Kremers' intention to write a guide for teachers, using the text to make their instruction more effective. Because of his illness he was not able to undertake the work. Dr. Urdang has been asked to do this work and has consented. The Guide will be published by Lippincott and will be given gratuitously to teachers who own the text. It is also planned to discuss the content and plan of the guide at the next annual seminar of the Institute. After the publication of the Guide, there will still be much to be said toward the improvement of teaching the history of pharmacy and we hope Dr. Urdang will use the pages of this journal for that purpose.

University of Buffalo, School of Pharmacy.—Paul D. Williams, LL.B., University of Buffalo Law School, has been appointed instructor in jurisprudence.—Arthur P. Wyss, Ph.D., University of Colorado, 1935, has been appointed associate professor of pharmacy and head of the department of pharmacy. Dr. Wyss was formerly connected with the Indianapolis College of Pharmacy and for the last four years has been one of the research staff of the Upjohn Company.

University of Colorado, College of Pharmacy.—Twenty five students have requested a charter for a chapter of the Junior American Pharmaceutical Association.—Members of the faculty are cooperating with the national committee making arrangements for the 1942 meeting of the affiliated pharmaceutical societies which will be held in Denver.—Plans are also being made for the Plant Science Seminar which precedes the annual meeting.—Lt. Lycurgus W. Johnson, B.Sc. in Pharm., June 1940, is the first graduate of the College of Pharmacy to lose his life at Manila. He enlisted in the Air Corps shortly after graduation, completing his training at Randolph and Kelly Fields and sailed for Manila on June 6.—Prof. D. W. O'Day is assisting in the presenting of a course on powder and explosives, which is a part of the National Defense Program in which the University is taking part.—Twenty-five per cent of the student body this year are women.—While graduate work is not given in pharmacy at Colorado, there are scholarships and assistantships which are open to graduates in pharmacy who wish to do graduate work in chemistry, bacteriology and related fields.—This year, R. N. Castle from the University of Idaho, College of Pharmacy and B. F. Stock of Purdue University, College of Pharmacy are assistants in the department of chemistry.

University of Connecticut, College of Pharmacy.—On October 4, the weekly radio program of the University was devoted to the College of Pharmacy with Dean Henry S. Johnson as speaker.—Miss Alice Esther Gavin has resigned from the English department and Richard Rudden, A.B., Amherst, A.M., Syracuse University has been named to fill the vacancy. Mr. Rudden has served on the faculty of the University of Missouri for four years.—Dean Johnson recently addressed the Bristol Rotary Club upon the subject "Chemistry in the Service of Medicine".—Robert H. Alcorn, lecturer in jurisprudence, now in active service in the Navy, has been promoted to the rank of Lieutenant Commander in the Judge Advocate General's Department.—Dr. Curtis P. Gladding, who has conducted a professional pharmacy at Hartford since 1870, has been elected an honorary member of the Curtis P. Gladding Honor Society. This society, named for Dr. Gladding, was founded in 1929. He is a former president of the National Association of Retail Druggists and has been the president of the board of trustees of this school from its beginning.

Detroit Institute of Technology, College of Pharmacy.—An open house under the sponsorship of the senior class was held on December 4, afternoon and evening. Demonstrations were given by the students covering various fields of chemistry, pharmacy, biology and bacteriology. A number of local pharmaceutical plants collaborated by making displays. The displays had an educational value and were attended by about two thousand visitors representing various local science clubs and high school groups.

Duquesne University, School of Pharmacy.—The third pharmacy clinic for practicing druggists was held on December 11, 1941. Those on the program and their subjects were: Dr. John A. O'Donnell, Pharmaceutical Service for the Diabetic; Prof. Stanley P. Porter, The Department of Diabetic Supplies; Dr. Charles H. Becker, Modern Remedies; Prof. Ralph R. Kreuer, Developments in Dispensing Pharmacy. Following the program, junior and senior students provided laboratory demonstrations in pharmacy, biochemistry and pharmacology.

University of Florida, School of Pharmacy.—Mr. J. K. Attwood, first vice president of the A.Ph.A., was initiated as an honorary member of Rho Chi in November.—A group of pharmacy students gave a program before the Northeast Florida Pharmaceutical Association at Live Oak in December.—Messrs. Donate-Torres, Nunez-Melendez and R. Z. Gelpi, who recently received the Master's degree from Florida, have returned to their teaching positions in Puerto Rico.—C. T. Pacenta and W. M. Benson, who received the Master's degree in 1941, are now employed by the Burrows Wellcome Company and Sharp and Dohme, respectively.—During Pharmacy Week radio talks were given by faculty, students and pharmacists. Rho Chi presented a playlet on one broadcast and C. R. Jordan and Dr. L. D. Richards were guest speakers at civic club meetings at Jacksonville.—Governor Holland has recently appointed Dr. P. A. Foote to act as chairman of the Florida State Defense Council Committee to arrange for instruction in the protection of public buildings and industrial plants. Dr. Foote is also serving as

advisor to the Division of Health and Housing of the State Defense Committee.

George Washington University, School of Pharmacy.—The Herbert C. Esterday Memorial Laboratory for pharmacology is being equipped with complete physiological and pharmacological apparatus for students working in groups of three. In addition there will be a large amount of general apparatus for the use of students as a whole.—Dean W. Paul Briggs, as chairman of the Committee on Civilian Defense of the District of Columbia Pharmaceutical Association, has formulated a plan in which each store in the metropolitan area is especially prepared to render first aid service. Each store qualifying must have certain equipment and a properly qualified personnel.

University of Georgia, School of Pharmacy.—Dr. William Rees Lloyd, who recently received an advanced degree from the University of Minnesota, has been added to the faculty replacing Dr. W. A. Purdum who has returned to the University of Maryland.—The senior class is the largest in the history of the school.—Mr. John W. Nelson, who did graduate work at Purdue last summer, has returned as an instructor in pharmacognosy and pharmacology.—Dean R. C. Wilson is working with Drs. Morris Fishbein and Theodore G. Klumpp of the American Medical Association on a plan for improving medical and pharmaceutical relations.—The science division of the University, including the school of pharmacy, on November 14, sponsored an address by Dr. Marvin R. Thompson before the Science Club on "Detoxifying Agents".—Mr. A. Burney Huff, a graduate student in chemistry and a senior in pharmacy, is carrying out a research on the commercial oils of turpentine.—Dr. W. Taylor Sumerford, early in December, spoke before the Zoological Club on the subject "Local Anesthetics".

State University of Iowa, College of Pharmacy.—At a meeting sponsored by the student branch of the American Pharmaceutical Association, Dean R. A. Kuever presented the George Jay Scholarship to Miss Elizabeth M. Holmes, a senior student and daughter of Mr. C. J. Holmes, a pharmacist of Indianola. The cash value of this scholarship is \$100. It is given to the student voted most deserving by the faculty and the recipient must have a grade average of not less than three points for all work carried in the University. Miss Holmes' grade was 3.72. The donor of the scholarship is Mr. George Jay, a retail pharmacist of Shenandoah, Iowa, who owns and operates a store established by his father in 1888. Mr. Jay is to be commended highly for the establishment of a scholarship which can not serve him in no selfish way. It is an outright contribution to the improvement of his own profession by stimulating a desire for scholarship. George Jay is an educator. May there be more like him.—Dean Emeritus Wilbur J. Teeters, who was founder of the Iowa chapter of Sigma Alpha Epsilon, was honored recently on the occasion of the fiftieth anniversary of his membership in the fraternity. A portrait of the Dean was presented to the chapter. It will be hung in the chapter house.—Prof. Zada M. Cooper, as a part of a program for Iota Sigma Pi, described the historical significance of the various exhibits in the Veteran Druggists' Museum.—Deans Teeters and Kuever, and Prof. Zopf have each given a number

134 *American Journal of Pharmaceutical Education*

of addresses recently before the various divisions of the Iowa Pharmaceutical Association and various clubs and organizations throughout the state.

Long Island University, College of Pharmacy.—Dr. Paul Kosok, Professor of History at the Brooklyn College of Pharmacy and Professor of Music at Long Island University, has recently returned from a combination concert tour and musical expedition in South America. In Lima, Dr. Kosok was the first North American guest conductor of the National Symphony Orchestra of Peru. He brought back from the Amazon jungles, the Andes, and all parts of South America, copies of some of the works of promising composers in Latin America and is playing these at the Brooklyn Museum Concerts.

University of Maryland, School of Pharmacy.—Changes in faculty personnel: Dr. William Arthur Purdum, appointed assistant professor of pharmacy; Richard H. Bang named William R. Warner research fellow in pharmaceutical chemistry; John M. Cross, assistant in physiological chemistry; Pierre F. Smith, assistant in chemistry; G. Allen Moulton, Jr., assistant in pharmacology; John A. Scigliano, assistant in bacteriology and Joseph W. Shook was transferred from bacteriology to pharmacy and detailed to hospital pharmacy; George P. Hager, Jr., to accept a position at Northwestern University; Carrol P. Foster to go to the Noxzema Company; and Bernard P. McNamara and Dr. Nathan Levine to accept positions with the Upjohn Company.

Massachusetts College of Pharmacy.—The course in first aid has been expanded so that each senior will have completed at least the standard Red Cross course before graduation.—Francis X. Lambert, assistant in the department of Language, has resigned in order to enter military service and Dr. S. Wilcox Harvey has been appointed to succeed him.

University of Michigan, College of Pharmacy.—Dr. Esperanza Castro, who received the Ph. D. degree last June, is now teaching in the chemistry department of the University of the Philippines and in the department of pharmaceutical chemistry of the Philippine Women's University at Manila.

University of Minnesota, College of Pharmacy.—Dean Charles H. Rogers was the guest speaker at the annual banquet of the Minnesota Veterinarians' Association.—Dr. George Crossen attended the national convention of Kappa Psi Fraternity at Philadelphia in December.—Dr. Charles V. Netz recently gave a special lecture on the "Chemistry of Cosmetics" to the students of the home economics department.—The Sixth Pharmaceutical Institute will be offered February 16, 17 and 18, in the Center for Continuation Study. The faculty of the Institute includes staff members from the College of Pharmacy, Schools of Medicine, Business Administration and Chemistry and from the department of Psychology. Guest lecturers will be Dr. E. Fullerton Cook of Philadelphia, Dean William A. Jarrett of Creighton University, Dr. Arthur Uhl of the University of Wisconsin, Dr. William H. Stoner of Bloomfield, New Jersey, and Dr. Ralph A. Perkins of Detroit.

A special half-day session for hospital pharmacists is in preparation. The Center for Continuation Study on the University campus, is a complete unit for accomodating "refresher" courses. The accomodations include hotel rooms, resturant, class rooms, library and garage.

Montana State University, School of Pharmacy.—Governor Ford officiated at the inauguration, on December 8, of Dr. E. O. Melby as president of Montana State University, and President Englehardt of the University of New Hampshire delivered the inaugural address. As part of the exercises an Educators' Conference was held. Topics dealing with administration, instruction and admissions were the main themes of interest.—During the first quarter of the present school year, an educational film portraying the making of glass and the manufacture of glassware was shown to the student body.

Ohio Northern University, College of Pharmacy.—A plan has been approved by the Lima, Ohio hospital for internships for a limited number of seniors or graduates of the Ohio Northern College of Pharmacy who are interested in hospital pharmacy.

Ohio State University, College of Pharmacy.—Dr. L. David Hiner has been elected to a place on the Faculty Council to represent the pharmacy area in its regular meetings.

University of Oklahoma, School of Pharmacy.—DeLoyce Barton and Harold Fritzlan have enrolled in the Navy as Pharmacists Mates, 2d class, and are stationed at San Diego.—Scott Robinson is pharmacist in the Naval Base Hospital at Corpus Christi, Texas.—Dr. E. E. Dale of the history department spoke on early day drug store experiences in the state of Oklahoma at a recent Rho Chi initiation dinner. The initiates were Robert Brown, Maurice Willis and Martha Roach. Miss Roach is the third member of the Roach family to be elected to membership in the Society.—Dr. Ralph Bienfang has been elected to represent the School of Pharmacy in the newly created Faculty Senate of the University.—Since the beginning of the fall term Dr. Bienfang has talked on the subject of "Odors" before the Norman Rotary Club, Kappa Psi, Guthrie Rotary Club, Norman Lions Club, Old Regime of Norman, Physiological Club, Norman Kiwanis Club, Sigma Xi Society, the Pansy Unit of the Norman Garden Club, the Oklahoma Junior Academy of Science, the Women Physicians of Oklahoma at Oklahoma City, Oklahoma City Lions Club, and Anderson-Prichard Oil Corporation Convention in Chicago.—President Emeritus W. B. Bizzell has named Dr. Loyd E. Harris and Dr. Bienfang to the general committee in charge of the semicentennial of the University to be held during the year 1942.—The fifth annual school for retail pharmacists and sales personnel will be held on February 3, 4 and 5.

Oregon State College, School of Pharmacy.—Beta Chapter of Rho Chi will sponsor a weekly seminar for upper-classmen, primarily to stimulate interest in current pharmaceutical and medical developments.—Four of this year's pharmacy freshmen are children of alumni of the school of pharmacy.

Philadelphia College of Pharmacy.—During the month of October

President Ivor Griffith spoke before the Rotary Clubs of Emmaus and Boyertown, Pennsylvania, the Parent Teacher Association of Glenside, The Cecil County Chapter of the American Red Cross at Elkton, Maryland, the Allied Medical and Scientific Society of Philadelphia, and the junior and senior medical students of Temple University. During Pharmacy Week, President Griffith, Prof. L. F. Tice and Registrar John E. Kraemer spoke over several local radio stations.

University of Pittsburgh, School of Pharmacy.—On December 15, the alumni association held a meeting at the college which was not restricted to alumni. The purpose was to consider various impacts which may be made upon pharmacists because of war conditions. At this particular meeting, the program was centered around emergency work and demonstrations were made of various phases of such work by different groups of students.

University of Southern California, College of Pharmacy.—The college staff is cooperating with the California State Board of Pharmacy in working out a program for Civilian Defense in case of air attacks, which is something we must prepare for here on the west coast.

The State College of Washington, School of Pharmacy.—Dr. Allen I. White served as acting secretary of the Public Health Section of the Northwest Scientific Association at the annual meeting at Spokane, December 29 and 30.—On November 24, a special meeting of the Washington State Pharmaceutical Association was held in Yakima. Because of the acute shortage of pharmacists in the Pacific Northwest, the meeting adopted a resolution recommending that pharmacy students who have successfully completed one year of their studies and who maintain a favorable student record be given special consideration for deferment from military service.—On October 3, a meeting of pharmacy students was held, sponsored by the A. Ph. A. Student Branch, Rho Chi, and Lambda Kappa Sigma.—The McKesson-Robbins Scholarship of \$50 was awarded to Robert Honodel.—The Seattle and Spokane Women's Auxiliaries of the Washington State Pharmaceutical Association presented three scholarships of \$25 each, to Lorraine LeMar, Henry Bossherd, and Theodore Hagen. Since that time, the Seattle Auxiliary has awarded two more \$25 scholarships to Robert Hendrickson and Vera Ehlers.—Prof. Haaken Bang has been elected Satrap of Province XLV of Kappa Psi and will attend the national convention at Philadelphia on December 28 and 29. William Beach was the delegate of Beta Pi Chapter.

The New Hampshire Pharmaceutical Association is to be commended for the nature of its educational program and the effort and enthusiasm being put into it. A program of instruction was prepared with great care for the benefit of New Hampshire druggists and carried to them through the medium of the state association conventions over a period of years. The convention theme for 1939 was Establishing Public Confidence in Pharmacy; for 1940 it was Preparedness for National Defense; and for 1941 it was War and Pharmacy, dealing with the problems of pharmacy during the actual war period. The next phase of action will be the service pharmacists may extend because of their special training and resources to the emergency medical personnel and the State Council of Defense.

Miscellaneous Items of Interest

President's Bulletin

Number 5

Now that we have got over the first shock of war, we must begin to chart our course with wisdom and resolution. We must march in closed ranks, calmly and deliberately and with a united purpose. Total war requires stability above all.

Letters are being received, almost daily, with respect to changes for the duration, in the course of study leading to the degree Bachelor of Science in Pharmacy. The three suggestions most frequently made are:

1. The acceleration of teaching programs by going to a 12-months basis. On December 16, the Association of American Medical Colleges strongly recommended such a program to its member schools, effective July 1, 1942. It is now believed that virtually every medical school will go to a 12-months basis utilizing either the 4-quarter or the 3-trimester basis. The American Association of Dental Schools has apparently taken no action thus far. According to the Journal of the American Dental Association, there were 167 dentists in the Army as privates in December.

The age of the average student now entering the schools of pharmacy is between 17 and 18 years. If vacations are eliminated, the course in pharmacy could be completed in 3 years of 12-months each rather than in 4 years of 9-months each. Many students in pharmacy could thus be graduated before they are called into service.

2. The second suggestion is to shorten the course with special reference to the three year rule adopted by the Association, effective January 1, 1938. It has been suggested that students with Bachelor of Science degrees, and with programing to that end, should be enabled to finish in two and one-half years. It is said, moreover, that students with advanced training have refused to enter pharmacy on being told a 3-year attendance rule is in effect. It is doubtful that this suggestion will find favor since it represents a definite retrogression in pharmaceutical education. In many schools, in fact, this would not be feasible since all courses are standard in scope and so recognized by graduate colleges and accrediting agencies.

3. The other suggestion is to continue on the present basis until we know what our new duties, if any, are to be. It has been suggested that for the immediate future, this appears to be a war of production. If this is to be the policy, it should include extra effort to the course in hand. For the teacher, it should mean a little more and a little better teaching: For the student, a little more study, a little more library work, a little more use of the laboratory apparatus, to provide a training and a readiness so necessary for the tasks ahead.

In reaching a decision with respect to the advisability of changing the present course, careful consideration should be given to the following extremely important and relevant questions:

1. What is the actual nature of the vacancies that now exist in pharmacy? Is there actually a shortage in the professional field so that communities are having difficulty in getting pharmaceutical service?

2. What is the actual demand for pharmacists now in the defense forces of the country, and what is it likely to be in the near future?

3. What possibility is there that the war may end sooner than is now anticipated, and that the larger number of graduates together with the pharmacists released from the service may make employment difficult and establish for pharmacy an inferior economic condition for a long time to come? This is particularly important if this war, as has always been the case, is followed by a period of depression.

4. What possibility is there that the improvements in the practice of pharmacy accomplished by the A.Ph.A., the N. A. B. P. and the A. A. C. P. may be adversely affected?

5. How important and necessary is it that our students engage in remunerative employment during the summer months to finance their stay in school?

6. Will the State Boards of Pharmacy agree to admit graduates from accelerated courses to the licensing examinations? Are they, in some states, enabled to do so without a change in law?

7. Since two-thirds of the students come directly from high school, will the number entering an accelerated program justify the change unless the secondary schools also adopt a 3-year course on a 12-months basis?

8. Students with pharmacy definitely in mind, frequently take a year of two of college or junior college work, a portion of which applies as advanced credit. What will the situation be with respect to these students unless these institutions also go on a 12-month basis?

9. What will be the source of the additional funds necessary for salaries and laboratory equipment and supplies? It is not believed that an increase in the number of students and in tuition can possibly counter-balance this expenditure. Since there are few General Assemblies this year, special provisions from the Legislature will not be available until the beginning of 1943.

10. If the college of pharmacy is a part of a university, what is the policy of the university likely to be with respect to an accelerated program of teaching for the other colleges and divisions on the campus?

The dean of every member college is expected to express himself fully with respect to this very important situation. It is highly desirable to have the opinion of every dean at this time concerning each question which has been raised. Your opinion is earnestly solicited as soon as you and the administration of your institution shall have formed it.

R. A. Kuever, President

President's Bulletin Number 6

One month ago today we became a nation at war in a conflict that was forced upon us by an infamous act of a nation with which we were supposed to be at peace. The debacle at Pearl Harbor and the events that followed immediately, confused our outlook for a short time. Now the prospect is clearing. Above all, it is chin up, a clear head with firm control of tongue and temper. In closed ranks we march calmly and deliberately with a united purpose, firmly resolved to do the best there is in us, and to meet every demand for pharmaceutical service the nation or its leaders may make.

This is a time to stand by until the machinery of our government tells us the need for our services has arisen.

During the month at war patriotic teachers and students alike have wondered whether work at hand should give way to enlistment and volunteer service as a direct aid to the country. In this connection, it should be remembered that this is not a period of individual choices. It is a time when each person responds to the call of the country whenever and wherever his services may be required. The preparing for and the prosecution of this all-out war is being directed by leadership. It behooves us, therefore, to be ready in our own little niche for whatsoever may come.

And it is important that we refrain, merely to be doing something, from doing those things which may come under the headings of "wasted energy" or "lost motion," particularly with respect to our curricula. At present there appears to be only one reason for an increased tempo in the production of pharmacists, and that is a demand for pharmacists from the defense forces of the nation.

A sufficient number of replies have been received to President's Bulletin, No. 5 to perceive the pulse of the situation at this time. The Baltimore meeting of January 3 and 4 did not take any action relating specifically to pharmaceutical education. Several speakers did reiterate the importance of students generally remaining in school. It should be remembered, however, that situations change quickly.

The following excerpts are from the replies that have been received:

"Unless there is a shortage of pharmacists for military service, I can see no good reason why we should make any effort to increase the number of graduates at the present time."

Dean DuMez (Maryland)

"The position of our faculty with respect to accelerating our course of study remains the same . . . we would sit tight until we had a statement from the War Department that graduate pharmacists were urgently needed in our defense forces; that they would recognize their training and give them pharmaceutical work to do when inducted into the army; and they would request us to expedite the training of pharmacists by accelerating our course of study."

Dean Rogers (Minnesota)

"I believe it is wise to wait until more facts are available before considering any radical changes in our present procedure in the operation of our colleges of pharmacy."

Dean Newton (Massachusetts)

"I don't know of any community that is suffering from the lack of capable pharmacists at the present time . . . speeding up our educational system offers great danger to the advancements that have been made in pharmaceutical education. It will be easy in a year to change our educational system so that we will lose all of the benefits we have gained in the last two decades."

Dean Lyman (Nebraska)

"The reduction of the 4 years to 3 years in order to acquire the pharmacy degree is not warranted at the present time, nor do I believe it will be within the next 2 years. This is based on the present demand and need for pharmacists in the army and in civilian life. I believe a shortage of pharmacists would be an excellent thing for the profession as a whole, provided we can keep the requirements high in the boards and the colleges and use our press to keep bad news out."

Dean McCloskey (Loyola)

"I believe we should continue on our present basis until we have more information of what is expected of us."

Dean LeBlanc (South Dakota)

"This University has decided to extend its summer session to such an extent that a baccalaureate degree may be obtained in some schools in 3 calendar years. We have made it clear that this does not apply to Pharmacy, and that we shall continue to function without curtailment of our schedule unless a national agreement can be reached. The Pennsylvania Board of Pharmacy writes that the Board takes the position that there should be no change in the schedule of schools of pharmacy."

Dean Muldoon (Duquesne)

"Although no action has taken place, it is proposed to make it possible for high school graduates to enter the University this next summer and thereby shorten the period of time required for graduation. The College of Pharmacy, however, will not be effected materially at this time. In the State of Washington, the situation regarding shortage of pharmacists is most acute. Pharmacists all over the state are clamoring for relief."

Dean Goodrich (Washington)

"No member of this faculty sees any real reason for surrendering the ground we have gained at the expense of so much hard work during the past twenty years. There is unquestionably a shortage of the 4-year-graduate type of pharmacist. There is no shortage of the cram-school type."

Dean Washburn (Colorado)

"In our state, there is an actual shortage in pharmacy, and we are having difficulty in filling positions; however, when the emergency is over, there will be more than enough pharmacists to fill these vacancies. Our state board is opposed to any accelerated courses to licensing examinations. In fact, our state laws would prohibit them from doing so."

Dean Leonard (Idaho)

"In my opinion at this time, any decided change in regard to acceleration of the teaching program would be an unwise move..... the armed forces have not made provisions for a definite place in the Army or the Navy for the number of pharmacists that it would turn out under an accelerated program. Until and unless they do this, I am very much afraid that it might lead to an overproduction of graduates after the war is over."

Dean Crowe (Tennessee)

"I favor continuing on present basis until the first hysteria of war has worn off at any rate."

Dean Curry (Louisville)

"There seems to be some shortage of pharmacists in our territory, not extremely serious yet. The demand for pharmacists in the defense forces seems essentially satisfied at present, but will probably take more men in the future. Some pharmacists are now being taken as ordinary soldiers. It seems doubtful whether a speeded up program would greatly increase the number of pharmacists. The major effect would seem to be that we would get them out sooner."

Ass't. Dean Schlichting (St. Louis)

"We do have a shortage of pharmacists insofar as serving the drug stores as they now exist. I am of the opinion, however, that we in our state, as in all states, have more drug stores than are actually needed for health service. Thus far we have had none of our students, who are registered by the Draft, called. In each instance the Draft Board has made deferment. It is my personal opinion that where possible the course should be taught on a 12-months basis."

Dean Hayman (W. Va.)

"Our institution is seriously considering going on a four quarter basis, beginning July 1. Virginia is getting satisfactory pharmaceutical service."

Dean Rudd (Medical College of Virginia)

"Purdue University, including the School of Pharmacy, has decided to go on the trimester plan of instruction beginning May 4. There is no intention of shortening the course, and we are opposed to any proposal that would tend to do so. No community in Indiana appears to be suffering from shortage of professional pharmaceutical service."

Dean Jenkins (Purdue)

"The College of Pharmacy of the University of Illinois is very definitely considering shortening the four calendar years required for the Bachelor's degree to three by establishing three trimesters of work per calendar year, thus eliminating all summer vacations . . . it is our opinion that under the present existing emergency pharmacy can ill afford to lag behind the sister professions of medicine and dentistry in their college training programs."

Dean Serles (Illinois)

Note: To date the American Association of Dental Schools has taken no action with respect to acceleration of the teaching programs in dental schools. R. A. K.

"Administrative Council of the University voted (January 7) to place all colleges of the university on a full four quarter basis. This includes the College of Pharmacy, and we are now making plans to operate on a four quarter basis effective with the opening of the summer quarter."

Dean Christensen (Ohio)

"There is a shortage of well trained pharmacists. It see no objection to the 3-yrs. of 12 months each as a substitution for 4 yrs. of 9 months each. In Ohio, however, the General Code says that at least two months must lapse between sessions. We should know our new duties before any radical changes are made in our educational program."

Dean Raabe (Ohio Northern)

"At Iowa no definite decision has been reached. The situation is being studied by the Board of Deans. The only likely acceleration in the offing now is to change the usual eight weeks summer session to one of 12 weeks."

Dean Kuever (Iowa)

This includes the announcements to date in reply to President's Bulletin, No. 5. It is urged that all reports be made to this office as soon as decisions with respect to teaching programs are reached.

R. A. Kuever, President.

Scholarships, Fellowships and Graduate Assistantships Available in Colleges of Pharmacy For The Academic Year 1942-43

University of Buffalo, School of Pharmacy

One teaching fellowship, \$500 and tuition.

Four scholarships of \$200 each from endowment for undergraduates.

Columbia University, College of Pharmacy

The Bigelow Fellowship for research in pharmacy value \$700. A stipulated amount of teaching required.

The Plaut Fellowship. Graduate study and research. Value \$850.

University of Florida, School of Pharmacy

Four graduate assistantships, \$450 each.

Several Scholarships, \$300 each that are not allocated to any particular department of the University.

University of Illinois, College of Pharmacy

Ten graduate assistantships, \$600 each with free tuition in hospital pharmacy, pharmacy, chemistry, and pharmacology-pharmacognosy.

University of Iowa, College of Pharmacy

Three teaching fellowships open to graduate students only. \$450, \$500, and \$900 respectively.

One teaching fellowship of \$250 open to graduate students or upper classmen.

The George Jay Scholarship of \$100 open to seniors only.

University of Maryland, School of Pharmacy

Three graduate assistantships in pharmacy \$555 per year of 8 months.

Four graduate assistantships in pharmacy (in hospital pharmacy) \$825.50 per year of 12 months.

Two graduate assistantships in pharmacology, \$555 per year of 8 months.

One graduate assistantship in bacteriology, \$555 per year of 8 months.

Four graduate assistantships in chemistry, \$555 per year of 8 months.

One graduate assistantship in economics, \$555 per year of 8 months.

In addition, remission of fees, except the laboratory and the diploma fee.

Some teaching service is required of the holders, which approximates 12 hours per week.

The H. A. B. Dunning Fellowship in pharmaceutical chemistry, \$1000 annually.

The William R. Warner & Co., full time research fellowship in pharmaceutical chemistry \$900 annually.

Research Grant of the Alumni Association for pharmaceutical research \$100.

The Charles Landon Memorial Scholarship, \$100 awarded annually to a fourth-year student who has shown superior proficiency in practical and commercial pharmacy.

The Fairchild Scholarship (National) \$500. Open to pharmacy students of the United States, on the basis of a competitive examination.

Massachusetts College of Pharmacy

Four graduate fellowships. Appointments are made on the annual basis but renewed if satisfactory. \$800 for first year and \$1000 for the second. Tuition not included in either case.

University of Michigan, College of Pharmacy.

Frederick Stearns and Company Fellowship. \$600.

Parke, Davis and Company Fellowship. \$600.

The Upjohn Company Fellowship. \$750.

Lilly Endowment Fellowship. \$750.

Monsanto Chemical Works Fellowship. \$700.

University of Minnesota, College of Pharmacy

The Minnesota State Pharmaceutical Association Graduate Fellowship at \$500 with exemption from tuition, open to sufficiently qualified graduates of the College of Pharmacy of the University of Minnesota.

The Grace Ellis Ford Fellowship of the Minneapolis College of Women's Club at \$750, open in alternate years to a graduate woman student without restriction as to major field. Offered for the year 1942-1943.

A number of fellowships in chemistry and the medical sciences amounting in value from \$225 to \$900 each, with exemption of certain fees when based on partial service to the University. Address the Dean of the Graduate School.

University of Nebraska, College of Pharmacy

Graduate assistant in pharmaceutical chemistry, \$500 with free tuition.

One in Pharmacology \$500 with free tuition.

The George A. Breon scholarship in pharmacology \$500 with free tuition.

Ohio State University, College of Pharmacy

Three graduate assistantships, \$450 each.

A limited number of graduate fellowships of \$500 and \$300 each, no teaching required. Includes remission of all fees except \$15 matriculation in each case.

A number of senior student assistantships which allow them to continue for advanced degrees.

Purdue University, School of Pharmacy

Two assistantships of \$700. each in pharmaceutical chemistry with exemption from tuition.

Two Purdue Foundation Fellowships at \$600. each with exemption from tuition.

One Purdue Research Foundation Fellowship at \$400 with exemption from tuition.

These positions are open to men and women having the Bachelor's or Master's degree.

Medical College of Virginia, School of Pharmacy

Available on July 1, 1942 are the following openings in its hospital pharmacy;

Pharmacy resident, \$50 a month and board, room and laundry.

Pharmacy interne, \$12.50 a month and board, room and laundry.

The positions are open to all graduates of four year pharmacy courses. One year of hospital experience is required for the resident. All work is done in the hospital pharmacy, and is on a rotating basis. Time is allowed both the interns and residents for independent research.

Washington State College, School of Pharmacy

One fellowship, \$750.

One teaching fellowship, \$750.

Two teaching fellowships, \$450 each.

One graduate scholarship, \$200.

Out-state tuition is not charged the holders of these positions, and there is no charge for materials or breakage.

University of Washington, College of Pharmacy

Seven teaching fellowships. Salary \$66 per month with free tuition.

Western Reserve University, School of Pharmacy

Three graduate assistantships of \$500 each and tuition.

Placement Service

The Placement Service is for those who care to use it whether seeking a scholarship, fellowship, assistantship, or instructorship. Key numbers will be used and names and addresses of applicants will be furnished on application to the Editor.

1. Senior pharmacy student at Washington State College. Age 20. Wishes to do graduate work in pharmaceutical chemistry and pharmacology.
2. Advanced senior at Ohio State University with a preference for pharmacology and pharmacognosy. B plus scholastic average, active in student activities, and president of the A. Ph. A. Student Branch. Interested in teaching as a profession.
3. Senior, Ohio State University, College of Pharmacy, with a preference for the field of pharmacy or pharmaceutical chemistry. B plus scholastic average. Research minded.
4. Senior, age 21, single, Protestant. B.S., in Pharmacy from Ohio Northern University, June, 1942. Desires assistantship in pharmacognosy or pharmacology.
5. Senior, age 20, single, Protestant. B.S., in Pharmacy from Ohio Northern University, June, 1942. Desires assistantship in pharmaceutical chemistry or pharmacology.
6. Age 21, B.S., in Pharmacy expected June, 1942, University of Colorado. Wishes to enter graduate work in pharmacology. Have worked as an assistant pharmacist during summer months and part-time while in school.
7. Age 21. Married, B.S., in Pharmacy, expected June, 1942. Interested in graduate work in bacteriology and pharmacy. Six months experience in drug store in Wyoming.
8. Senior, B.Sc., in June 1942, University of Connecticut, wished to major in Pharmacy.
9. Graduate of University of Southern California, College of Pharmacy. Will receive Master's degree in January. Wishes scholarship immediately as candidate for Doctor's degree in pharmaceutical chemistry. At present employed as instructor, part time basis. High grade average, interested in teaching and research.
10. Senior, School of Pharmacy, University of North Carolina, Age 24, married, and has Rho Chi average. Wishes major only in

pharmaceutical chemistry with a minor in pharmacy or pharmacology.

11. Senior, School of Pharmacy, University of North Carolina, single, wishes to do graduate work in pharmaceutical chemistry as a major.

Report of the Delegates to the National Drug Trade Conference of 1940*

The annual meeting of the National Drug Trade Conference was held at the Washington Hotel, Washington, D. C., on December 11, 1940. The conference was called to order at 9:30 a. m. by President Carson P. Frailey.

The following delegates were present: A. G. DuMez, Ernest Little and Charles B. Jordan, representing the American Association of Colleges of Pharmacy; Carson P. Frailey and Leslie Harrop, representing the American Drug Manufacturers' Association; George D. Beal, R. P. Fischelis and E. F. Kelly, representing the American Pharmaceutical Association; Harry Noonan, S. W. Fraser and J. H. Foy, representing the American Pharmaceutical Manufacturers' Association; George A. Moulton, R. L. Swain, A. C. Taylor and A. L. I. Winne, representing the National Association of Boards of Pharmacy; P. A. Hayes, H. M. Bingham and E. L. Newcomb, representing the National Wholesale Druggists' Association; F. Cullen, James F. Hoge and S. T. Helms, representing the Proprietary Association; and Rowland Jones, Jr., representing the National Association of Retail Druggists. The privilege of the floor was granted to the following visitors who were also in attendance: Messrs. Stephens Rippey, Hugh Craig, Henry D. Ralph, John P. Snyder, Wallace Werble, Justin Powers, W. F. Kebler, Floyd Thayer, Carson P. Frailey, Jr., W. Paul Briggs and Glenn Jenkins.

Reports were received from the following committees: Committee on Endowment, Ernest Little, Chairman; Committee on Food and Drug Legislation, R. P. Fischelis, Chairman; Committee on Information Regarding the Distribution of Drugs and Medicines, R. P. Fischelis, Chairman; and the committee on the Preparation of a Table of Potent and Toxic Drugs, R. P. Fischelis, Chairman. Dr. E. F. Kelly reported on the status of pharmacy in the military services. The report of the Committee on Endowment received the greatest amount of consideration and is of particular importance to the college of pharmacy. The action taken on this report will be found in the report of the Resolutions Committee which follows:

Report of the Committee on Resolutions

Chairman George D. Beal presented the following resolutions to the Conference:

*Note this is the report of the 1940 meeting which was prepared for the 1941 meeting at Detroit. The 1941 meeting which was held in December will appear in a future issue.—Editor.

I. WHEREAS: The National Drug Trade Conference believes that carrying to theoretical and technical extremes the application of warning and cautionary statements in the labeling of drugs and medicines sold directly to the public may create a condition of doubt and distrust of the value of medicinal agents in the minds of the public; and

WHEREAS; Experience taught that repeated and widespread use of such cautionary and warning statements results in a diminution of the cautionary value and leads to public indifference and disregard,

THEREFORE, BE IT RESOLVED, That the Federal and State authorities be urged to limit the requirement of such emphatic warnings and cautions to drugs and medicines of a dangerous and potent character, so that the public will ascribe to such warnings and notices the meaning therein intended, and receive that degree and kind of protection which the Food, Drug and Cosmetic Art contemplated.

II. RESOLVED, That the United States Pharmacopoeia and National Formulary Revision Committees be requested to consider the feasibility of including in their official standard, tables of poisons and toxic drugs, the distribution of which in the several states may be subject to the requirements of the State Poison Laws, to serve as a guide for uniform revision of State Poison Laws.

III. RESOLVED, That the National Drug Trade Conference hereby recommends that each state or local sales or use tax law contain a provision exempting drugs and surgical supplies, for the reason that such essential articles should not be subject to a consumption tax principally paid by the poor and needy and which is effective to increase the cost of medical care accordingly.

IV. RESOLVED, That the Committee on Endowment be continued and authority delegated to it to work out all necessary details relative to the organization of a body whose chief responsibility would be to collect and allocate funds in behalf of pharmaceutical education, and be it further

RESOLVED, That the President be authorized to call a meeting of the Committee on Endowment at a later date for the purpose of presenting the completed plan to the Conference.

V. WHEREAS, Ethyl alcohol is necessary and indispensable ingredient either as a solvent or as a preservative, or both, of many important drugs, medicines and medical supplies, therefore, be it

RESOLVED, That the National Drug Trade Conference urges the Federal and State Governments to remove any excise tax from ethyl alcohol used in bona fide medicinal substances with such safeguards and penalties against abuse as may be necessary, in order that the cost of these substances to the sick may be more reasonable.

Chairman Beal moved that Resolutions Nos. I, II, III, and IV be adopted. His motion was seconded and passed.

No action was taken on Resolution No. V for the reason that an unanimous vote could not be had due to differences of opinion in the membership of one of the member groups of the Conference.

The following are the officers elected to serve for the ensuing year:

| | |
|---------------------|--------------------|
| President..... | Carson P. Frailey |
| Vice-President..... | Harry Noonan |
| Sec.-Treas..... | Rowland Jones, Jr. |

Executive Committee:

Carson P. Frailey
E. F. Kelly
Harry Noonan
Herbert M. Bingham
F. J. Cullen
A. G. DuMez
A. C. Taylor
Rowland Jones, Jr.

December 15, 1940

A. G. DuMez.

Dr. George Urdang, Historian, American Association of Colleges of Pharmacy

(Letter of acceptance addressed to President R. A. Kuever.)

I received your letter of November 20 and feel very much honored by being offered the post of Historian of the American Association of Colleges of Pharmacy, successor to Dr. Edward Kremers.

I accept this offer gratefully and am fully aware of the responsibility which it involves.

In safeguarding pharmaceutical education in this country and keeping it up to date, the American Association of Colleges of Pharmacy is in fact the pulse of the profession. What becomes of the profession of pharmacy depends to a great extent on the capacity of the pharmaceutical educators to diagnose correctly the actual state of pharmacy as well as the general tendencies in a rapidly changing world.

The task of the Historian of the American Association of Colleges of Pharmacy as I see it, cannot be restricted to the recording of what the Association is doing. In tracing and clearly stating the anamnesis, he is to help the Association in its diagnosis and prognosis.

I am sure that in natural consequence of my being Historian of the American Association of Colleges of Pharmacy as well as Director of the American Institute of the History of Pharmacy, there will develop a close cooperation between both institutions to the benefit of American pharmacy as a whole. I cannot think any combination more promising of a fruitful symbiosis.

It is understood that every intimation of what the American Association of Colleges of Pharmacy expects of its Historian just now and every advice or demand you personally should be kind enough to convey to me would be received with due respect and appreciation.

Madison, Wisconsin,

November 22, 1941.

George Urdang, Director,

American Institute of the History of Pharmacy

The National Science Fund of the National Academy of Sciences

The National Science Fund was created by the National Academy of Sciences last spring as a means of helping to meet an increasingly urgent need for additional funds to support fundamental scientific research. A three-year study, conducted by a committee of Academy members headed by Dr. Albert F. Blakeslee, retiring President of the American Association for the Advancement of Science, showed clearly that since the early 1930's financial support of research has been decreasing, and that an authoritative advisory body was needed to assist public-spirited people who wish to make effective gifts to science.

Under the direction of a board of qualified scientists and distinguished laymen, the National Science Fund is now prepared to administer large or small gifts and to provide a center to which any person or group may go for competent and impartial guidance in making a fruitful investment in science. The Fund plans to work through existing agencies rather than carry on research of its own.

The successful development of the Fund over a period of years will depend first of all upon the understanding and wholehearted support of scientists themselves. They have the primary interest in its establishment, its progress, and in the aid which the Fund may ultimately extend them in their own research work. However, to all individuals and groups concerned with problems of human welfare and the nation's progress, maintenance of scientific advance is also of highest importance. I feel certain that your members will be genuinely interested in the National Science Fund, and that many will aid materially by assisting in the diffusion of information about it.

Information about the Fund may be obtained by addressing the Secretary at 515 Madison Avenue, New York City, New York.

December 1, 1941.

William J. Robbins, Chairman

The Tenth Educational Conference

The Conference was held under the joint auspices of the Educational Records Bureau, The Cooperative Test Service, the Committee on Measurements and Guidance of the American Council on Education, and the Commission on the Relation of School and College of the Progressive Educational Association, October 30-31, 1941, at the Hotel Biltmore, New York City, New York. The topics were divided between opportunities of and contributions by the independent schools and student guidance. The latter topic is particularly timely for the pharmacy group.

Dr. E. G. Williamson, dean of student affairs at the University of Minnesota and Dr. Alonzo G. Grace, Commissioner of Education of the State of Connecticut, were the speakers assigned to the topic "What Guidance Demands of Administrators." Dr. Williamson spoke on the coordination of personnel services. He stated that the ultimate good

of personnel service is self understanding. This he said is brought about by allowing the student to register his experiences, aiming, of course, toward the integration of the individual and social values. Through personalized induction to personalized stimulation it is possible to obtain a revaluation by the student if aided by continued motivation and readjustment of experiences. On the subject of personnel methods, the speaker believed that diagnostic tests might better be replaced by personalized interviews. The adviser should be available whenever the student feels the need for an interview. Staff conferences should be called for interchange and comparison of experiences.

Dr. Grace spoke on the problems of teacher selection. He advocated scholarships for the individual upon recommendation from the institution rather than by survey of the applicants transcript. He suggested that a fifth year of service be part of the teaching training. This is to serve as an internship before certification in order to qualify for the position as assistant teacher. Growth of the individual should be recognized. He advocated the licensing of university and college teachers on the basis of their knowledge of human nature and human behavior. Provision should be made for continued good teaching, even if research is lacking. The salary to be consonant with concurrent study and competence of the individual.

Dr. Andre Morize, professor of French literature of Harvard University believes that the teaching of foreign cultures should be included in the social studies. The powers that control Europe at the moment are sure to change. When that time comes, a sympathy and understanding among all people will be essential.

Dr. Stephen Duggan, director of the Institute of International Education stated that scholarships in our schools for students in Latin America would do much toward bringing about hemispherical solidarity.

Dr. James S. Plant, director of the Essex County Juvenile Clinic, Newark, New Jersey, in "The Psychiatrist Looks at the Pupil", stated that "The individual is made up of many sub-cultures which combine to make a loose federation of cultures. Some do not know which will dominate from day to day. The battle of Democracy is fought in our class rooms."

Regarding tests, the emphasis is very strong toward the standardization of learning and achievement tests.

Franchon Hart,
Columbia University

Bequests, Legacies and Gifts to the American Council on Pharmaceutical Education Exempt From Federal Taxes

In 1942, which is just around the corner, the American Council on Pharmaceutical Education will have completed the first ten years of its existence.

In these ten years, it has formulated standards for the accreditation of colleges of pharmacy, has perfected a working organization and has completed initial inspection of the sixty-eight colleges of pharmacy which have applied for accreditation. Of this number of colleges, sixty have been accredited.

Article II of the constitution of the Council states that it shall revise the principles and standards when deemed necessary or advisable and that it shall satisfy itself that the schools and colleges accredited are maintaining the proper standards by periodic reinspections. Nearly four years have elapsed since some of the accredited colleges have been inspected and it is, therefore, about time to begin the making of reinspections.

Up to the present time, funds for the operation of the Council have been provided through annual contributions of \$200 each from the American Pharmaceutical Association, the National Association of Boards of Pharmacy, and the American Association of Colleges of Pharmacy. The cost of inspection has been defrayed entirely by the individual colleges. Present indications are, however, that the colleges will not be able to stand the expense of periodic reinspections. Some other means will have to be found to provide the funds for this purpose. It may be that it will be found necessary to invite contributions from outside sources. It is, therefore, encouraging, in this connection, to be informed by the office of the Commissioner of Internal Revenue, Washington, D. C., that the Council is exempt from Federal income taxes and that it will not be necessary for the Council to file income returns. Furthermore, that contributions made to the Council are deductible by the donors in arriving at their taxable income; that bequests, legacies, devices and transfers, to or for the use of the Council, are deductible in arriving at the value of the net estate of a decedent for estate taxes and that gifts of property to the Council are deductible in computing net gifts for gift tax purposes.

November 17, 1941.

A. G. DuMez, Secretary

Report of the Delegate to the National Association of Retail Druggists

The Association met for its forty third annual meeting the week of October 6th, in Cleveland, with headquarters in Hotel Statler. Mr. Joseph T. Matousek was general Convention chairman. Mrs. Fred J. Cermak was general chairman of the Ladies' Entertainment Committee.

The opening session was held in the ball room of Hotel Statler where Governor Bricker welcomed the delegates and Mayor Blythin extended greetings and a welcome to the city. Some committee reports were then heard, followed by greetings from various interested organizations including that of the American Association of Colleges of Pharmacy which organization the writer represented.

The reception for President and Mrs. Samuel J. Watkins was followed by the President's Ball. Special feature entertainment was also provided for the guests.

The business sessions were held in the ball room of Public Auditorium. President Watkins addressed the session on Tuesday morning, and Secretary Dargavel's report followed.

The professional pharmacy section was presided over by Mr. Edward Spease. This department is a new venture and was reported as being successful. A display of products prepared by pharmacists, under the direction of Mr. George L. Secord appeared among the commercial displays.

The Wednesday session was addressed by Mr. A. G. Murray of the Food, Drug and Cosmetic Administration, and by Congressman Hatton W. Sumners who has been helpful and interested in legislation pertaining to pharmacy.

The Thursday session was addressed by Mr. H. J. Anslinger, of the Narcotic Office.

Thursday also witnessed the retirement of the old officers and the installation of the newly elected ones. Mr. Hugh P. Beirne of Connecticut was installed as president and Mr. John W. Dargavel was re-elected secretary.

The "Drug Show" consisting of displays by pharmaceutical manufacturers and others was well arranged on the main floor of Public Auditorium, the displays approximating one hundred in number.

The following special entertainment features were provided:

The Bob Hope program broadcast from the stage of Music Hall.

Exhibitors Night with ten acts—Music Hall.

G.E. Mazda Lamp, Hour of Charm, Phil Spitalny's All Girl Orchestra—Music Hall.

Edward D. Davy

The 175th Birthday of Rutgers University

One of the eight original colonial colleges, Rutgers University, this past October observed its 175th birthday with a three-day celebration that found 15 outstanding world personages, including exiled Queen Wilhelmina of the Netherlands and Wendell Willkie, receiving honorary degrees.

The program was composed of lectures, symposia, luncheons, and three dinners—the New Jersey Dinner at which speakers were Governor Charles Edison of New Jersey and Dr. Harold Stonier, executive manager of the American Banking Association; the Dinner for Delegates at which speakers were President Ernest M. Hopkins of Dartmouth, President William Mather Lewis of Lafayette, and President John Stewart Bryan of William and Mary; and the Alumni-Alumnae Dinner.

Climaxing the festivities was the convocation attended by a gathering of 3,000 on the final day when honorary degrees were awarded and those who attended heard addresses by President Robert C. Clothier of the University, President Clarence C. Dysta of the University of Wisconsin, and Queen Wilhelmina, speaking via a short-wave broadcast from London.

President Clothier declared the purpose of the anniversary was to serve as "a rededication of ourselves to the principles of enlightened

humanity—truth, good will, tolerance, honor in our relationships among men and nations, respect for the dignity of the individual man, upon which, in common with most other institutions, our University was founded."

In her absence the degree to Queen Wilhelmina was received by Netherland's Minister Alexander Loudon. In addition to Mr. Willkie, who was the recipient of the degree of Doctor of Laws, others on whom honorary degrees were conferred were: Doctor of Music, Roy Harris, composer; Doctor of Engineering, Karl T. Compton, president of Massachusetts Institute of Technology; Robert W. Trullinger, U. S. Department of Agriculture; Doctor of Letters, Rhys Carpenter, Bryn Mawr College; Doctor of Science, Irving Langmuir, Nobel Prize winner in chemistry, 1932; Ernest O. Lawrence, director of the Radiation Laboratory, University of California; Hugh Scott Taylor, Princeton University; Doctor of Humane Letters, Roy F. Nichols, University of Pennsylvania; Doctor of Laws, William H. S. Demarest, president of Rutgers from 1905 to 1925; Roscoe Pound, former dean of Harvard Law School; Dr. Dystra, President Clement C. Williams of Lehigh University; and Charles H. Mellwain of Harvard University.

EDWARD R. ISAACS,
Rutgers University

The Nineteenth Plant Science Seminar

Some twenty miles north of the great metropolis of Detroit, on the wooded rolling countryside of Oakland County, lies the little village of Bloomfield Hills. It was near here that Mr. and Mrs. George G. Booth, whose lives have been intimately connected with the esthetic as well as the business life of Detroit, and of Michigan generally, selected the 300-acre site for their contribution to the cultural and educational life of America, The Cranbrook Schools. In this setting of great natural charm they created their schools and housed them in buildings of exceptional architectural beauty, enhanced them with lovely landscaping and finally created the Cranbrook Foundation for their maintenance.

The motorist driving north on Woodward Avenue and turning west on Lone Pine Road to the Cranbrook gate is at once amazed at the almost instantaneous transition from the hustle and bustle and the whizzing traffic of Greater Detroit to the peace and quiet of rural England. In this delightful locality the Plant Science Seminar held its nineteenth annual meeting.

The Cranbrook group is composed of several institutions, The Brookside School, The Cranbrook School, The Kingswood School, The Academy of Art, Christ Church and others. Its youngest member is the Institute of Science, established in 1930 to broaden the horizons of man by research and education in the natural sciences. Early in 1941 Dr. Robert T. Hatt, Director and Mrs. Marjorie T. Bingham, Botanist of the Cranbrook Institute of Science sent cordial invitations to the Seminar to hold its meeting at Cranbrook. Mr. J. Russell Anderson

of Detroit, as local secretary, together with Mrs. Anderson, Professor C. C. Glover of the University of Michigan; Mrs. Bingham; and Dr. Hatt prepared a most excellent program. Arriving on Sunday and Monday, August 10th and 11th the group was at once impressed with the beauty and charm of the place. They were housed in the comfortable dormitory of The Cranbrook School and were served delicious meals in its impressive Gothic dining hall, all at the nominal cost of \$3.00 per day. The Cranbrook School and the Cranbrook Institute of Science outdid themselves in supplying every want of the visitors.

The detailed proceedings of the Seminar are published in the Proceedings of the Journal of the American Pharmaceutical Association. It is not the intention therefore to present here a report of the 1941 Seminar but rather to briefly review some of the many worth-while experiences enjoyed by those attending the Seminar this year. In 1938 the Cranbrook Institute of Science acquired a beautiful modern building. In this building are housed a museum notable for its plan of exhibits and beauty of display, an excellent library of technical and popular works of science, reference collections of natural history material, laboratories, shops, animal rooms and an auditorium equipped with every modern method of projection. All meetings, lectures and discussions were held in this auditorium and in addition the Institute furnished the use of its collecting and preparation materials for those desiring to collect and preserve specimens.

The Institute of Science is perhaps less concerned with the records of original research than it is with advancement of appreciation and understanding of the world of nature and the interpretation of the results of research into the language of the layman. Its botanist, Mrs. Marjorie T. Bingham, literally on speaking terms with every plant in Michigan and an expert on the Orchidaceae, is delightfully endowed with the ability to thus interpret the lore of plants. Her two addresses to the Seminar, one an illustrated talk on the Flora of Oakland County in which she traced the history of this 900 square-mile area from pre-glacial times to the present day and another in which she described the 53 orchids growing wild in the State of Michigan were gems and delighted all who were privileged to hear her. Mrs. Bingham is also president of the Michigan Wildflower Association, an organization having as its aims: the protection of Michigan's fast dwindling native wildflower through the formation of a body of public opinion which will result in the enactment of suitable protective legislation; the fostering and encouragement of nature study and conservation programs carried out in the schools; and the promotion of research on Michigan's native flora which will lead to the publication of books and articles on Michigan trees, shrubs, wildflowers, medicinal and food plants. In her capacity as president of the Wildflower Association Mrs. Bingham arranged for a joint botanical excursion for that organization and the Plant Science Seminar. This seventy-five mile itinerary of points of outstanding botanical interest in western Oakland County made eight stops, including one at Cass Lake State Park for luncheon. Oakland County is a typical glaciated country, abounding in glacial lakes, having over 400 in the county alone. The eskers, drumlins, terminal and lateral

moraines between these lakes are covered with forests of oak and hickory, or beech and maple, as the soil and terrain determines. Together with these dominant forest types are flood-plain forests of two principal kinds—evergreen and the usual elm, maple and ash. The lakes are often the center of coniferous bogs, which differ greatly in character. While tamarack is the most prevalent of these bog trees, cedar, spruce and pine are dominant species in many of the bogs. Their presence has perpetuated a number of plant communities distinctly boreal in character; communities which are more commonly found in latitudes much farther north. Seven types of forests were visited during the day: an oak-hickory forest, a mixed hardwood forest, a beech-maple forest, a flood-plain forest, a tamarack bog, an oak forest and a typical climax forest of virgin beech and maple. The group was surprised and delighted to find such a wealth of variable plant life. Many had never seen pitcher plants growing in profusion as they did in the tamarack bogs, nor had they seen the poison sumac with its red stems and petioles. Many hundreds of species were observed and collected before returning to Cranbrook. As director and guide Mrs. Bingham did a splendid job and it will be many years before this excellent field trip will be forgotten.

Through the courtesy of Professor Clifford C. Glover and under his direction the Seminar spent one day visiting the University of Michigan at Ann Arbor. Visits were made to the Michigan League Building, the Burton Memorial with the Baird Carillon, the Horace H. Rackham School for Graduate Studies, the Law Quadrangle including Hutchins Hall and the Law Library, the General Library, the Michigan Union, the West Quadrangle, Mosher-Jordan Halls, the University Health Service, The University Hospital and its Pharmacy, the University Museums and the College of Pharmacy. After luncheon at the Michigan League Building, a visit was made to the University's Athletic Plant followed by a motor trip over the famous Huron River Drive, with its winding roads, swimming pools and picnic grounds. In one of these, through the courtesy of Professor Glover the Seminar carried out its traditional watermelon feast. During the Ann Arbor visit, many small groups visited places of individual interest, including the University Arboretum and green houses and the various laboratories of the botany department.

Within easy driving distance from Cranbrook are many places of botanical interest. Of these, two were visited by the Seminar: The Oakview Seed Breeding Farm of the Ferry Morse Seed Company and the Parkedale Biological Farm, both near Rochester, Michigan. At the former the members saw several thousands of samples of vegetable and flower stocks and inspected various methods of breeding including selfing. Dr. Arthur Frank and Mr. Dalton R. Ozanne exhibited their work with rust-resistant beans yellows-resistant cabbage. Dr. Gordon Morrison supplemented the visit with an interesting talk on the activities of the farm and described his work with colchicine. At the Parkedale Farm the members inspected the fields of belladonna, digitalis and other drug plants and the numerous displays prepared for them by Mr. Carpenter of the Parkedale staff.

Beside the two splendid addresses by Mrs. Bingham the members were privileged this year to enjoy a program of excellent and timely addresses which included the following: "A History of the State of Michigan Department of Conservation" with an outline of its work and accomplishments by Mr. Norman F. Smith of its Forestry Division. Mr. Smith exhibited many slides and two excellent motion pictures illustrating the activities of his department. Professor E. N. Gathercoal reported upon his survey of medicinal plants in the State of Michigan in which he stated that 210 of Michigan's native plants were used as drugs and that in addition Michigan had some 25 drug plants under cultivation. Professor William J. Bonisteel spoke on "Some Aspects of Cyto-genetics" and "Dichogamy and its role in Breeding" and Mr. Heber W. Youngken Jr. discussed "The Growth Effects of Thiamin Chloride, Pyridine, Piperidine and Atropine Sulfate on Stramonium Seedlings." Dr. Marin S. Dunn showed the kodachromes of his recent Alaska trip and related many experiences from his journey through Alaska. New additions to the Seminar's collection of Kodachromes by Dr. E. L. Newcomb and Professor P. D. Carpenter were exhibited and both of these gentlemen spoke briefly about them. Professor Darbaker and Dr. Wirth exhibited their movies of past seminars. These films date back to almost the beginning of the Seminar and present a visual history recalling many happy incidents of by-gone years.

Three radio broadcasts were made concerning the Seminar, one over WWJ by Mrs. Bingham, one over WWJ by Mr. John E. Seybert and one over W45D by Professor Heber W. Youngken. Mr. John E. Seybert of Indianapolis served as chairman and conducted all sessions of the Seminar. Once again a delightful Seminar has passed into history. Beside the splendid program so briefly outlined above and the many advantages offered, all present experienced a week of worthwhile vacationing. New friendships were formed and old ones renewed and each took with him many bits of helpful information. The Cranbrook Institutions were most genial hosts, doing everything in their power to make the meeting a happy and successful one. Here again was a splendid opportunity to bring one's family and to enjoy with them a week of relaxation and also to benefit by the acquisition of helpful ideas; to make new and wholesome friendships and to discuss with others mutually interested, the problems of plant science—the purpose of the Seminar.

The Nineteenth Annual Plant Science Seminar was attended by some sixty members and guests and many additional visitors attended one or more of its meetings. Among those present were Mr. and Mrs. J. Russell Anderson and J. Russell Anderson Jr., of Detroit, Michigan; Professor and Mrs. F. J. Bacon, Cleveland, Ohio; Professor and Mrs. Leslie B. Barrett and Gordon Barrett, New Haven, Conn.; Professor Gordon A. Bergy, Morgantown, W. Va.; Miss Carolyn A. Binder, Camp Grant, Illinois; Mrs. William Binder, Oak Park, Illinois; Mrs. Marjorie T. Bingham, Bloomfield Hills, Michigan; Professor W. H. Blome, Detroit, Michigan; Dr. William J. Bonisteel, Scarsdale, New York; Professor Paul D. Carpenter, Chicago, Illinois; Professor and Mrs. Edward P. Claus, Pittsburgh, Pa.; Dr. L. K. Darbaker, Pittsburgh, Pa.; Dr. and Mrs. Marin S. Dunn, Philadelphia, Pa.; Professor and Mrs. E. N. Gathercoal, Pentwater, Michigan; Professor and Mrs.

C. C. Glover, Ann Arbor, Michigan; Dr. and Mrs. Irvine W. Grote, Chatanooga, Tenn.; Dr. Elmer L. Hammond, Oxford, Miss.; Dr. and Mrs. Robert T. Hatt, Bloomfield Hills, Michigan; Dr. and Mrs. L. David Hiner, Columbus, Ohio; Professor and Mrs. Larny F. Jones, Indianapolis, Indiana; Mrs. Charles Kvicala, Baltimore, Md.; Mr. Carroll J. Mather, Mount Clemens, Michigan; Dr. and Mrs. A. W. Matthews and Stewart Matthews, Edmonton, Alberta; Dr. and Mrs. E. L. Newcomb, Montclair, N. J.; Mr. C. A. Peterson, Wyandotte, Michigan; Dr. J. Allen Reese, Lawrence, Kansas; Dr. and Mrs. O. A. Rossi, Buenos Aires, Argentine Republic; Dr. A. John Schwarz, Memphis, Tenn.; Mr. and Mrs. John E. Seybert, Indianapolis, Indiana; Mr. and Mrs. Norman F. Smith Lansing, Michigan; Dr. and Mrs. Frank J. Slama, Baltimore, Md.; Dr. and Mrs. George L. Webster, Chicago, Illinois; Professor and Mrs. Ralph F. Voigt, Chicago, Illinois; Dr. Elmer H. Wirth and Miss Marilyn J. Wirth, Oak Park, Illinois; Mr. Heber W. Younken Jr., Minneapolis, Minn. and Dr. and Mrs. Heber W. Youngken and Eugene Youngken, Arlington, Mass. In addition Mrs. Ruth Mosher Place, Garden Editor of the Detroit News; Dr. Ernst A. Bessey, Professor of Botany of the Michigan State College; Professor Charles H. Stocking, Dr. Frederik F. Blicke and Dr. Elmon A. Cataline of the University of Michigan; Dr. Gordon Morrison, Mrs. Gilbert Bently, Dr. Arthur Frank and Mr. Dalton R. Ozanne of the Ferry-Morse Seed Breeding Farm; Mr. Carpenter of the Parkedale Farm; Professor and Mrs. Ralph E. Terry, Miss Jean Terry and Ralph Terry, Jr., of Elmhurst, Illinois; and some fifty members of the Michigan Wildflower Association attended one or more meetings of the Seminar.

The Twentieth Annual Seminar

The Twentieth Annual Plant Science Seminar will be held in the Summer Camp of the University of Colorado during the week of August 9-15, 1942. Once again the Seminar will be privileged to enjoy a meeting in the mountains, this time in the high Rockies. Many who recall the Black Hills meeting in 1929, the Portland meeting in 1935 and the Blue Ridge meeting in 1939 will look forward with a great deal of anticipation to this splendid opportunity. Professor David W. O'Day, of the College of Pharmacy of the University of Colorado will act as local secretary. The Seminar is particularly fortunate in having Dr. O'Day as local secretary. Besides being on the staff of the College of Pharmacy he is Business Manager of the University Camp and is thoroughly familiar with the locality and its possibilities. He promises a splendid meeting. Here is an opportunity to enjoy all the usual features of the Seminar plus the beauty and grandeur of the Colorado Rockies.

What the war situation will be in August no one can foretell. Service to Our Country is of greatest importance and commands our foremost attention and utmost effort. It may be impossible to hold a meeting of the Seminar, but at this writing plans for a meeting are formulated. Watch the pharmaceutical journals for announcements. A post card mailed to the Secretary (808 South Wood Street, Chicago) will put your name and address on our mailing list for Announcements. Remember, there is no fixed membership in the Plant Science Seminar. Everyone interested in plant science is welcome. This

year the Seminar offers the flora of the Rocky Mountains, a week of outdoor life in a comfortable camp, delightful and invigorating mountain air, elaborate mountain scenery and a splendid program with many new and interesting features.

ELMER H. WIRTH, Secretary,
University of Illinois

Abstracts of Papers Presented Before the Subsection on Pharmacy of the American Association for the Advancement of Science at Dallas, Texas, on December 29, 1941.

Chemistry of *Hydrastis canadensis* L. by Elmer L. Hammond, University of Mississippi.—During the course of the investigation four different lots of the drug were used. Lots A, B, and C consisted of the comminuted drug, lot D of 4,300 Gm. of an alcoholic extract prepared by a pharmaceutical house from 22.7 Kg. of the comminuted drug.

Ash, moisture, pentosan, and tannin determinations were made on each of the first three lots. The percentage of ether-soluble alkaloids present was determined on lots B and C by the N.F. VI method. Lots A and C were subjected to extraction with selective solvents by the modified Dragendorff method. A volatile oil determination was made on lot C.

Moisture determinations made on lot D indicated that 25.99 per cent of water was present. On this basis the dry alcoholic extract represented 14.02 per cent of the weight of the powdered drug.

Lot D was extracted with Skelly solve B, and the combined extracts were saponified. The mixed fatty acids thus obtained were separated into saturated and unsaturated portions by the lead-alcohol method. The saturated and unsaturated fatty acids were present in the mixture to the extent of 25 and 75 per cent, respectively.

The mixed saturated fatty acids, after regeneration from their lead salts, were separated by fractional crystallization from alcohol, and the relative percentage of each was calculated. Arachidic, stearic, and palmitic acids were present to the extent of 9.3, 62.0, and 28.7 per cent, respectively, in the five purest of the seven fractions examined.

The mixed unsaturated fatty acids were regenerated from the lead soaps, brominated, and the resulting mixed bromides separated by means of appropriate solvents. From the percentage of bromine in each fraction, determined by the Stepanow method, together with the melting points of the respective fractions, the presence of linolenic, linoleic, and oleic acids was shown. From the data obtained, the respective percentages of linolenic acid hexabromide, linoleic acid tetrabromide, and oleic acid dibromide present in the mixed bromides of the unsaturated fatty acids were computed.

A phytosterol, m.p. 133.5°—134.5°C., [a]_D^{26°} —37.61° (in chloroform), and a hydrocarbon or mixture of hydrocarbons, m.p. 64.3—65.5°C., were isolated from the unsaponifiable matter. From the phytosterol was prepared the acetate, m.p. 128—129°C., [a]_D^{26°} —35.78° (in chloroform).

Two samples of marc from lot D were subjected to continuous extraction successively with acetone, chloroform, and water. Qualitative tests were made on the respective extracts thus obtained. Determinations of cellulose and of lignin were made on samples of the marc after treatment as described.

Some New Aspects of the Hypnotic and Analgesic Effects of Selected Barbiturates by Donald Slaughter, Baylor University, Dallas, Texas.—The Eddy method of determining quantitative pain-pressure effects in cats was used in this study. Controls were obtained for a period of a month on all animals until a constant level of arbitrary pain-pressure units (which was in the experimental percentage error) was reached. Following this routine, doses of sodium barbital, pentobarbital and "seconal" were given to these animals by intramuscular injection. By trial it was determined that 100 mg/kg of sodium barbital, 15 mg/kg of pentobarbital and 15 mg/kg of "seconal" produced considerable analgesia, but what is more important they produced about the same degree of hypnosis and sedation. Following these tests one-half the dose of sodium barbital and "seconal" and three-fourths the dose of pentobarbital was found not to produce appreciable analgesia and very little hypnosis and sedation. Each of these two separate groups of results on the drugs used was the average of three distinct sets of experiments on each drug and for each dose on ten or eleven cats. The final averages of all of these tests closely approximated an individual experiment on a given drug using a given dose.

Finally, 0.085 mg of prostigmine methylsulfate was combined with 50 mg/kg of sodium barbital, 7.5 mg/kg of "seconal" and 10 mg/kg of pentobarbital. Using the same technique this combination of drugs gave almost as much analgesia, hypnosis and sedation as the larger dose of any one of the barbiturates administered alone. This is not a summation effect, because when one adds the hypnotic and analgesic action of the dose of prostigmine administered separately to the effects of the small dose of any one given barbiturate administered separately the total effect is much less than the effects of the combined injection of prostigmine and the smaller dose of any of the barbiturates.

This suggests that since prostigmine is a known cholinergic drug and since it apparently potentiates or enhances the hypnotic and analgesic action of the barbiturates, one may conclude that these pharmacological effects may in themselves be cholinergic and that these selected barbiturates fall into such a category.

A Phytochemical Study of *Leptotaenia Multifida* Nuttall by Wm. R. Lloyd, University of Georgia, and Glenn L. Jenkins, Purdue University.—A complete examination of this plant yielded approximately 1 per cent of a volatile oil which consisted chiefly of sesquiterpene hydrocarbons and a sesquiterpene alcohol. A large amount of oleoresin was obtained which on dry distillation yielded terpenes and sesquiter-

penes. A crystalline lactone was isolated and studies of the derivatives prepared from it and of its properties indicate that it is an isomer of a known compound nodakenetin.

The Occurrence of Thymol and Carvacrol in the Plant Kingdom and their Significance in Botanical Systematics by C. C. Albers, University of Texas, College of Pharmacy.—The isomeric phenols thymol and carvacrol have been reported to be present in the plant kingdom in 10 families of the flowering plants. Neither phenol has been detected in any of the non-flowering groups, thallophytes, bryophytes, or pteridophytes. Of the ten families containing these substances, nine belong to the angiosperms and one to the gymnosperms, namely the pine family. Eight of the nine families of angiosperms are dicots, the monocots being represented by a lone species, *Zea Mays*, of the grass family. Hence it is evident that these phenols occur predominately in the dicot group of the angiosperms. Two families of this last group are especially outstanding in the number of species that yield one or both of these phenols: the mint family with fifty-seven species and the parsley family with six species. For the first time one of these phenols is reported present in a member of the composite or thistle family, the writer having isolated thymol from the volatile oil of *Pectis tenana* Cory, collected in Bosque County, Texas.

Without exception, these chemical substances occur dissolved in the volatile oil obtained from the plant by steam distillation. Whereas both phenols frequently occur side by side in the same volatile oil, one always predominates. In fact, in some oils one phenol occurs to the exclusion of the other, and in some of the *Monarda* or horsemint oils it may constitute as high as 60 per cent of the volatile oil. In view of the abundance of *Monarda* species in the United States, this fact takes on economic importance, especially if the phenol be thymol, since the natural product is obtained commercially from thyme and ajowan oils imported from the old world. Hence the price fluctuates considerably according to world conditions. For example the price of thymol rose from a pre-World War I normal price of \$2.50 per pound in 1912 to an all-time high of \$22.75 per pound in 1917, after which it steadily declined until in 1937 it had reached approximately the pre-war price of 1912.

Of these two phenolic substances, thymol was the first to come under notice in 1725 by Carlos Neumann. It was over 100 years later, in 1841, that carvacrol, the liquid isomer, was first described and named by Schweitzer. A summary of the chemical and physical means of separating and identifying these phenols is given, as well as a classification of the individual species of plants containing each phenol with references to the literature. Of all the crystalline derivatives prepared to identify these phenols, the phenyl urethanes lend themselves very satisfactorily for this purpose because of their considerable difference in melting points.

A Phytochemical Study of *Ephedra Nevadensis* by Loyd E. Harris, University of Oklahoma.—*Ephedra Nevadensis*, Wats. grows in southwestern Oklahoma. Certain Asiatic species of *Ephedra* produce the valuable product known as ephedrine. The species *nevadensis* was studied and found to produce no ephedrine. It might be possible to

hybridize this species with some Asiatic species and produce a plant that would grow in this climate and yield ephedrine.

Petro Waxes by Loyd E. Harris, University of Oklahoma.—A Petro-wax, made by solvent extraction from petroleum, by the Bareco Oil Company of Barnsdall, Oklahoma can be used to replace beeswax in ointments. This wax also serves equally as well as Ceresin, an imported product, to prevent "Oil leakage" from ointments and to permit the incorporation of as much as fifty percent water. The wax is designated as Bareco 160 Wax.

A Phytochemical and Pharmacological Study of *Hermidium Alipes*, S. Wats by C. H. Waldon, Glenn L. Jenkins, and R. N. Bieter, Purdue University.—*Hermidium alipes*, S. Wats is an interesting drug plant because of the similarity in its qualitative and quantitative action to that of epinephrine, an animal derivative. During the course of the experiments to isolate the pressor principle an oleoresin was isolated and its physical constants were determined. The oleoresin did not exhibit any blood pressure raising qualities. Numerous experiments were run in the quest for the pressor substance. Among those that offered possibilities were precipitation with immiscible solvents and electrodialysis. An evaluation of the precipitates obtained by the immiscible solvent method showed that the concentration of the active substance had been increased to about fifty times that of the original drug, but all attempts to isolate it in pure form failed because of the extreme lability of the pressor substance. Electrodialysis seemed to offer great possibilities, but each time isolation was attempted the pressor substance was lost before a pure product was obtained.

Official Medicaments, an Answer to the Present Drug Shortages by Leon W. Richards, Howard College, Birmingham.—The pharmaceutical and medical professions of the United States have a grave responsibility in the present world conflict. Theirs is the job of keeping the nation healthy. They must prevent as far as possible any loss of time or effort of our civilians or fighters through sickness. Apathy on this front will prove as disastrous as a shortage of men or munitions. War has already made extra demands on our limited reservoir of medicinal supplies. The people of the United States of America must be awakened to the necessity of conserving our resources in this battle for our existence. As a nation we have been and are at present grossly guilty of wantonly wasting our resources. We have lived lavishly too long, and it will be difficult to overcome this habit.

If we are to meet this mighty crisis of our republic intelligently, not only must we plan for the present exigency, but we must think in terms of long-range planning. It is the patriotic duty of every branch of American industry to take stock of itself and to see that all non-essential products containing materials vital to the national defense, public health, and safety of the nation be eliminated.

The drug industry has already reported acute shortages of many important crude drugs and chemicals. The stocks on hand and the raw materials available in the future must be put to their optimum uses. This means the entire drug industry must make adjustments, and these adjustments will impose real sacrifices on all members of the industry. Specifically, there are thousands of medicaments of questionable value

on the shelves of over some 58,000 drug stores of this country. Moreover, there are countless unnecessary duplications or near duplications of many of the valuable time-proven remedies. In time of war this is wastefulness, and we must face this fact. A ruthless curtailment of production must be made in some phases of the industry. Indications to date have shown a whole-hearted cooperation on the part of the manufacturers with government officials in endeavoring to solve this vital problem.

The total number of medicinal preparations, both obsolete and modern, in the pharmacies of today will number in the thousands. One has but to look on the inventories of these stores to find from ten to twenty thousand medicinal articles listed. Turnover on many of these items is extremely slow and in some prescription articles there may be no repeat call. Deterioration of many of these slow moving items, a serious problem at any time, takes on added significance when measured in terms of war-time economy. A partial solution of this complex problem with its many ramifications is the utilization of official medicaments whenever possible. By maximum utilization of official preparations diversity of medical stock could be kept at a minimum. More rapid turnover would result, and the ultimate consumer would benefit not only from this discriminating distribution of available materials but from the fact that medicinal costs would be kept at a minimum.

The publication of the U. S. Pharmacopœia XII and the National Formulary VII ushers in a new era in the history of official medicaments. The adoption of a continuous revision program by the Committees of Revision has added immeasurably to their practicability. Another important step forward is the inclusion in the Pharmacopœia of preparations that are subject to patent control. These books on official drugs never before have been brought so nearly into apposition with the best medical practice of the day. The Revision Committees, manufacturers, and government officials are already cooperating in an endeavor to insure flexibility of the official standards so as to meet the special emergencies as they arise.

Manufacturers, journalists, physicians, and pharmacists can render notable service in extending Pharmacopœial information. Many practicing physicians and pharmacists are of the opinion that the official preparations are a group of antiquated remedies. Promotional publicity can not succeed if it is not enthusiastically supported by a well-informed sales force. It is our duty to see that every member of both professions become intimately acquainted with present day official medicaments, so that they may be used to the maximum benefit to the nation in its hour of need.

Relative to our program in Dallas, we had very few in attendance. However we did have an interesting round table discussion of the papers conducted in an informal manner which everyone thought was both of value and which they reported was better than a formal program. Among those in attendance were Dr. Donald Slaughter, Baylor University, Dallas; Dr. C. C. Albers, University of Texas, Austin;

Loyd Harris, University of Oklahoma, Norman; T. C. Barnes, Hanne-man Medical College, Philadelphia; and Glenn L. Jenkins, Purdue University, Lafayette, Indiana.

Glenn L. Jenkins.

Our Pharmaceutical Associations Merit and Need Support, Now!

In the January 19, number of *Drug Topics*, with his usual clarity, Dr. Robert L. Swain, points out the difficult times which lie ahead and the necessity for druggists to maintain their morale. He stresses the great need of becoming organization minded in order that we may maintain our "unity of purpose, unity of strength, and unity of spiritual resolve.—Deserting our associations now would be just about as sensible as turning off the water when the fire breaks out.—This is the time to stick to our pharmaceutical associations, national, state, and local. They represent pharmacy mobilized and on the march, and pharmacy must be kept on its toes during these turbulent, fighting times." Let us not fail pharmacy at the time of its greatest need!—Editor.

The Nebraska Ruling

In the January 26 number of *Drug Topics*, Dr. Swain calls attention to the possible hazards which a ruling presents that has recently been made by Dr. A. L. Miller, Superintendent of the Department of Health of the State of Nebraska. The ruling requires the presence of a pharmacist in a store a minimum of eight hours a day. Dr. Miller, who is doing a better job at law enforcement in Nebraska than any other officer has done in the same position for many a day, made the ruling in belief it would facilitate law enforcement. To one who is probably more familiar with the tremendous reaches in rural Nebraska than the average New Yorker is with the apartment house in which he lives, this ruling, if the law is enforced, will increase the number of jobs for registered pharmacists and registered owners of stores to a degree that the state has never enjoyed. It will insure every community of having a qualified pharmaceutical service at least eight hours a day. And it will do more than that—it will keep a registered man in the community for emergency service for twenty-four hours a day. Even draft boards can see that there is justice in the requests for deferment when they cannot get qualified pharmaceutical service in their own communities.

A much greater danger is that the eight hour minimal ruling will be interpreted by the registered man, that he will consider it makes him eligible to join a labor union—and work only eight hours a day. This idea has hit the nurses in this western country and they insisted some time ago on having eight hour shifts, then they wonder why employment fell. Whatever the war does to the rest of us, it makes it possible for nurses to live during the duration. No professional health

group has ever yet been able to defend its professional status and go on a tradesman's basis as regards hours of labor. The drug clerks of the northwest tried it and found themselves taking orders from the head of the teamsters union. Some method has got to be found to keep a druggist in our rural communities. Otherwise, those same communities will be clamoring for state pharmacy as they are now clamoring for state medicine. Perhaps after all Dr. Miller has taken a forward step in the solution of our problem.

Rufus A. Lyman.

Dr. Robert P. Fischelis has been appointed Chief of the Medical and Health Supply Section of the Division of Civilian Supply. Through Dean Charles H. Rogers, he is asking the colleges of pharmacy to assist in the gathering of information and statistical data for both short and long range programs which will assure the satisfactory flow of necessary supplies to the civilian population throughout the war emergency. Information is being sent to all deans from Dean Rogers' office.

Science Service has extended an invitation to all faculty members of member colleges to avail themselves of a reduced price subscription to Science News Letter. "The Privilege Card" saves \$2.00 on a \$5.00 subscription. These cards are only available to members of organizations in science and education, such as the American Pharmaceutical Association and the American Chemical Society. A list of member-colleges has been sent to Science Service so that these cards may be sent to the deans of the colleges. Anyone wishing one should be able to obtain it from his dean.

Editor John E. Flynn of Biological Abstracts, University of Pennsylvania, 38 Street and Woodland Avenue, Philadelphia, is in need of a collaborator for the Journal of the Pharmaceutical Association of Japan. It should be someone who is trained in pharmacy and who at the same time can translate Japanese.

Columbia University, College of Pharmacy.—A student branch of the American Pharmaceutical Association was formally inaugurated January 8, 1942, with an initial membership of fifty. The speakers of the occasion were Deans Ballard and Wimmer, Dr. J. Leon Lascoff; Dr. R. L. Swain; and Mr. Cheng Loon Hooi.—Mr. Herman Loebe, 1922, formerly a Lieutenant in the Medical Administrative Corps, has been promoted to Captain and is stationed at the Army Medical School in the Pharmacy Division at Washington. Stationed at the same place is Mr. Leon Rose, 1933, who has recently been commissioned as Lieutenant in the Medical Administrative Corps.—The executive committee of the Alumni Association has invested \$1000 of its reserve in a defense bond.—A course in emergencies has been established with 86 registrants.

Philadelphia College of Pharmacy and Science.—Classes in emergencies have been established for junior and senior students.—Dean Griffith has offered the services of the College to the War Department for the instruction of naval pharmacists as was done in the first world war.—Sixty students have offered their blood to the Red Cross for the preparation of plasma

MARRIAGES

Mr. Robert Edward Thompson, assistant in pharmacology in the School of Pharmacy, University of Maryland, and Miss Elizabeth Seibert Roberts on May 31, 1941, at the Church of the Ascension and Prince of Peace.

Mr. Kenneth Eldred Hamlin, Jr., William R. Warner Fellowship, School of Pharmacy, University of Maryland, and Miss Janet Constance Hoy, on June 18, 1941. Dr. and Mrs. Hamlin are now residing in Urbana, Illinois.

Mr. Joseph Okrasinski, School of Pharmacy, University of Maryland, and Miss Mildred Osiewicz, on October 11, 1941, at The Holy Rosary Church.

Mr. Walter Christian Gakenheimer, assistant in pharmacy, School of Pharmacy, University of Maryland, and Miss Katherine Justina Parker, also of the School of Pharmacy, class of 1939, on September 9, 1941, at First Methodist Church, Baltimore.

Dr. Frank Mayer, instructor in pharmacognosy and pharmacology, University of Maryland, and Miss Lucille Quink on November 14, 1941.

Mr. Walter Shoska, assistant in physics, University of Illinois, and Miss Lois Smith, on December 20, 1941.

Mr. Charles F. Masten, Jr., teaching fellow in pharmacy, Washington State College, and Miss Alice Hunt of Spokane on December 27, 1941.

NEW IN THE FAMILY

John Michael Stoklosa.—Born November 27, 1941, son of Mr. and Mrs. Mitchell J. Stoklosa, Massachusetts College of Pharmacy.

Elaine Harriet Gershon.—Born July 29, 1941, daughter of Dr. and Mrs. Solomon Gershon. University of Illinois, College of Pharmacy.

Barbara Ann Kaski.—Born September 23, 1941, daughter of Mr. and Mrs. Ignatius Kaski. University of Illinois, College of Pharmacy.

Diane Lee Adamson.—Born November 17, 1941, daughter of Mr. and Mrs. Raymond Adamson. University of Illinois, College of Pharmacy.

Mary Noel Ocenasek.—Born December 8, 1941, daughter of Mr. and Mrs. Joseph C. Ocenasek. University of Illinois, College of Pharmacy.

New Books

Emulsions and Foams.—by Sophia Berkman and Gustav Egloff. Reinhold Publishing Co., New York. 1941. 591 pp. P

The authors state that the art of producing emulsions and foams and the art of resolving them depends upon their control. The book is intended to furnish the theoretical and practical backgrounds necessary to exercise this control forcefully.

The book can be divided into 3 major sections. The theory of emulsions and foams, both of which are given individual consideration, is covered in detail in the first section. Modern interpretations are

supplemented by many graphic pictures and mathematical formulae. An extensive bibliography of 296 references completes the subsection on the theory of emulsions, and 73 references round out the subsection on the theory of foams.

Methods of emulsification and of demulsification are described in detail under the heading, "Practical Knowledge of Emulsions". Discussed here are methods of preparation, emulsifiers, colloids, mechanical equipment used, method of demulsification, including heat treatment, action of chemicals, freezing, electrical methods, etc. Special consideration is given to asphalt and bitumen emulsions and to lubricants and lubricating oil emulsions. The discussions of them are greatly detailed, including introductions, methods of preparation, methods of analysis, and properties. This portion of the book, comprising section two, consists of Chapters 2, 3, and 4. Adding tremendously to this important section is a bibliography containing 1,469 references.

The final or third section of this book is devoted to laboratory methods of examining emulsions. Described here are methods for microscopic examination, physical-chemical measurements, and chemical analysis. A bibliography of 128 references completes this section.

Teachers of pharmacy can gather from this book a thorough knowledge of ointments, emulsions, and cosmetic preparations. The fine author and subject indices render the book easy to use.

P. J. J.

The Chemistry of Organic Medicinal Chemicals.—by Glenn L. Jenkins, Ph.D., Dean and Professor of Pharmaceutical Chemistry, Purdue University and Walter H. Hartung, Ph.D., Professor of Pharmaceutical Chemistry, University of Maryland. John S. Swift Co., Inc., St. Louis, Mo. 1941.

In this exceedingly comprehensive text of 457 pages, the authors offer an unusual but entirely rational classification of the vast field of medicinal organic chemicals. It is impossible to describe the tremendous scope of this compact treatise in a few sentences. The 15 chapters average 7 major subdivisions, under each of which the respective compounds are discussed at considerable length. The organic medicinal products described include non-official substances along with those which are recognized in the U.S.P., the N. F., and the N. N. R. Those which are official are titled in boldface type to make them conspicuous. Along with the general run of organic chemistry, the text offers much in the fields of phytochemistry, zoochemistry, and the chemistry of the volatile oils. Originality is one of its qualities.

Numerous features are combined to make the book outstanding in its field. That it is up-to-date in every respect is evidenced by the modern discussions of the vitamins, hormones, bile acids, sulfanilamide derivatives, cardiac glycosides, carcinogenic substances, etc. The pages are covered with countless structural formulae, tables, and graphs. References are plentiful. Specific references are recorded as footnotes on the pages, and a classified bibliography is offered for suggested outside reading.

A general discussion introduces each chapter. This is followed in turn by sub-sections devoted to nomenclature, occurrence, preparation,

properties, physiological action, individual products, and references for review. The outstanding chapters in the book are those concerning hydrocarbons, hydroxyl derivatives of hydrocarbons, carbonyl group, carboxyl group, natural mixtures, amines, heterocycles, and stereoisomerism.

This text book, which is intended for students who have had basic training in organic chemistry, fulfils the needs of anyone interested in medicinal organic chemicals. It will serve not only as a splendid textbook, but also as an excellent reference.

P. J. J.

Organic Reagents in Inorganic Analysis.—by Ibert Mellan. The Blakiston Co., Philadelphia, 1941. xxiii and 682 pp. \$9.00.

The purpose of the book is clearly stated by the author. The use of organic compounds in inorganic analysis is a well known practice, but references to the specific tests are scattered throughout the literature. The efforts of the author will save much time for the individual investigators.

The book is divided into 3 parts, the first of which is concerned, in brief fashion, with fundamental principles and theories. In the second section, covering 195 pages, 233 organic reagents are arranged in alphabetical order. The reagents are not merely mentioned; their common names, molecular formulae, structural formulae, description, and physical properties are given. General statements are also made concerning the inorganic compounds with which the reagents will react. The third section comprising approximately two-thirds of the book, is devoted to methods of procedure, both qualitative and quantitative. The elements, radicals, ions, and compounds for which the tests were devised are arranged in alphabetical order. There are approximately 450 tests described in this section.

There are hundreds of references to the original works, thus making the book not only a good laboratory guide, but also an excellent reference source. The occasional omission of specific directions for the preparation of reagents will not interfere with the profitable use of the text.

P. J. J.

The Blood Bank and the Technique and Therapeutics of Transfusion,—by Robert A. Kilduffe, A. B., A. M., M. D., F. A. S. C. P., Director, Laboratories, Atlantic City Hospital; City Bacteriologist, Atlantic City; Serologist, Municipal Hospital for Contagious Diseases, Atlantic City; Pathologist, Atlantic County Hospital for Tuberculosis Diseases; Serologist, Betty Bacharach Home for Crippled Children; Serologist, Jewish Seaside Home, Atlantic City; Formerly, Major, Medical Corp, United States Army, and Michael De Bakey, B. S., M. D., F. A. C. S., Assistant Professor of Surgery, School of Medicine, Tulane University; Visiting Surgeon, Charity Hospital, Touro Infirmary, and Mercy Hospital, New Orleans; Associate in Surgery, The Oschner Clinic, New Orleans. 1942. 558 pages. 214 illustrations and one color plate. The C. V. Mosby Company. Price \$7.50.

A most timely book giving the story of blood transfusion from the time of William Harvey down to the present day. A recital of the titles of some of the chapters best gives the reader the scope and content of

the book: The history of transfusions; rational, indications and contra indications; the military aspects of transfusion; special types of transfusion and technique of blood typing; the nature, causes, deletion and methods of elimination of anomolism blood typing reactions; the "Universal Recipient"; the blood bank and its operation and the dangers which occur in stored blood; plasma transfusions, preparation and preservation of citrated plasma and of concentrated and dried blood; and the technique and complication of blood transfusion. Each chapter is followed by an excellent working bibliography. The illustrations are especially lucid and complete in illustrating methods and techniques. It is fortunate that such a complete and practical work should appear at the moment of great need for such a book, both in the experimental field and with the fields of battle banding the earth.

R. A. L.

Clinical Immunology, Biotherapy and Chemotherapy in the Diagnosis, Prevention and Treatment of Disease,—by John A. Kolmer, M.S., M.D., Dr., P.H., Sc.D., LL.D., F.A.C.P., Professor of Medicine, Temple University, School of Medicine; Director of the Research Institute of Cutaneous Medicine, and Louis Tuft, M.D., Assistant Professor of Medicine and Chief of Clinic of Allergy and Applied Immunology, Temple University, School of Medicine. 1941. 941 pages. 27 illustrations. The W. B. Saunders Company. Price \$10.

The book is divided into two parts. Part I covers the general aspects of infection, immunity biotherapy and chemotherapy and gives the basic information which is necessary for an intelligent understanding and carrying out of the subject matter of Part II which deals with the practical applications of immunity biotherapy and chemotherapy in the treatment of disease. No brief review can give justice to the completeness of this book for the purpose for which it was intended, which as the authors state, was to prepare a book "primarily from the clinical and practical standpoint for practitioners of medicine and of public health." Further they state "no effort has been made to include detailed descriptions of the technics of serological or purely laboratory methods, since brief descriptions are of little or no value and the necessary detailed descriptions are to be found in books devoted to the subject. Their general aspects and practical applications, however, have received careful attention. On the other hand, such immunologic procedures as are conducted by practicing physicians, especially skin tests, have received detailed consideration. Furthermore, no effort has been made to render the book bibliographic, as a mere compilation of the enormous literature would have enlarged it too greatly and led us too far afield. We have endeavored, however, to give the principal references for those interested in consulting original sources." A very fine feature of the book is the use of boxed in information which gives summaries of the etiology, pathogenesis, epidemiology, immunity, blood cultures, complement-fixation, and skin tests, prophylactic vaccinations, and therapy for such diseases and also tables giving the comparative affectiveness of various drugs and of the different related compounds such as the sulfon series. This method is invaluable to the busy student and practitioner for quick reference.

R. A. L.

INSTITUTIONS HOLDING MEMBERSHIP IN THE ASSOCIATION

NEW YORK

University of Buffalo, School of Pharmacy, Buffalo; A. R. Landon, Dean (1930).

Columbia University, College of Pharmacy of the City of New York, New York; Charles W. Ballard, Dean (1932).

Fordham University, College of Pharmacy, New York; Charles J. Nelson, acting Dean (1933).

Long Island University, Brooklyn College of Pharmacy, Brooklyn; Edgar H. Schaefer, Dean (1933).

NORTH CAROLINA

University of North Carolina, School of Pharmacy, Chapel Hill; J. Grover Smith, Dean (1917).

NORTH DAKOTA

North Dakota Agricultural College, School of Pharmacy, Fargo; William F. Miller, Dean (1931).

OHIO

Ohio Northern University, College of Pharmacy, Ada; Rudolph M. Smith, Dean (1933).

Ohio State University, College of Pharmacy, Columbus; Raymond V. Goshorn, Dean (1930).

University of Toledo, College of Pharmacy, Toledo; Geo. L. Nelson, Dean (1941).

Western Reserve University, School of Pharmacy, Cleveland; Edward B. Miller, Acting Dean (1933).

OKLAHOMA

University of Oklahoma, School of Pharmacy, Norman; David B. R. Johnson, Dean (1935).

OREGON

Oregon State College, School of Pharmacy, Corvallis; Adolph Bode, Dean (1943).

PENNSYLVANIA

Duquesne University, School of Pharmacy, Pittsburgh; Hugh C. Matheson, Dean (1937).

Temple College of Pharmacy and Science, Philadelphia; Ever Grisham, Dean (1930).

Temple University, School of Pharmacy, Philadelphia; H. Everett Keady, Dean (1933).

University of Pittsburgh, Pittsburgh College of Pharmacy, Pittsburgh; H. Leonard O'Connell, Dean (1935).

PENNSYLVANIA

University of the Philippines, College of Pharmacy, Manila; Rodrigo V. del Rosado, Dean (1937).

Puerto Rico

University of Puerto Rico, College of Pharmacy, Rio Piedras; Luis Torres-Ibanez, Dean (1933).

Rhode Island

Rhode Island College of Pharmacy and Allied Sciences, Providence; W. Henry Brown, Dean (1933).

SOUTH CAROLINA

Medical College of the State of South Carolina, Charleston; Robert Wilson, Jr., Dean; School of Pharmacy, Washington H. Seider, Director (1943).

University of South Carolina, School of Pharmacy, Columbia; Henry T. Motter, Dean (1933).

SOUTH DAKOTA

South Dakota State College, Division of Pharmacy, Brookings; Floyd J. Lofgren, Acting Dean (1933).

TENNESSEE

University of Tennessee, School of Pharmacy, Memphis; Robert L. Groves, Dean (1933).

TEXAS

University of Texas, College of Pharmacy, Austin; William F. Gilley, Dean (1933).

VIRGINIA

Medical College of Virginia, School of Pharmacy, Richmond; Wesley F. Reid, Dean (1933).

WASHINGTON

University of Washington, College of Pharmacy, Seattle; Dean: J. Goodrich, Dean (1943).

State College of Washington, School of Pharmacy, Pullman; Paul H. Martin, Dean (1943).

WEST VIRGINIA

West Virginia University, College of Pharmacy, Morgantown; L. Lester Harman, Director (1933).

WISCONSIN

University of Wisconsin, School of Pharmacy, Madison; Arthur H. Ott, Dean (1930).

